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LEROY ANDERSON DAM INUNDATION STUDY

Prepared for:

Santa Clara Valley Water District

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Prepared by:

MEAD HUNT ENGINEERS ARCHITECTS SCIENTISTS PLANNERS

Mead & Hunt, Inc.
3327 Longview Drive
North Highlands, CA 95660

June 2003

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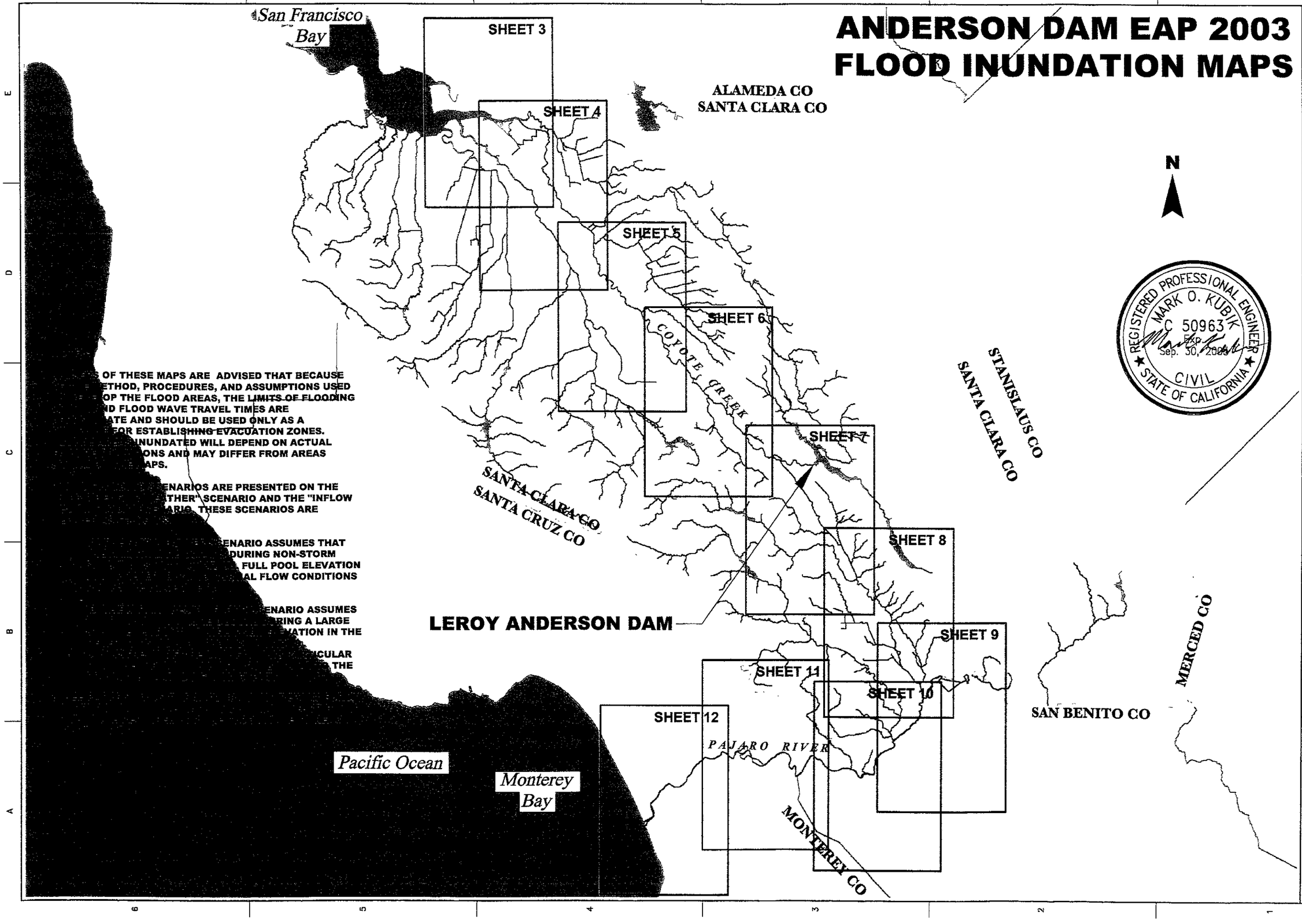
MEAD HUNT ENGINEERS ARCHITECTS SCIENTISTS PLANNERS

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June 2003

ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS



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ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS

MEAD & HUNT

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Santa Clara Valley Water District

REVIEWED BY: M. Moore

ACCEPTED BY: R. J. Volpe

DATE MARCH 2003
DESIGN MOK
DRAWN SG
CHECKED MOK

REFERENCE INFORMATION AND NOTES

Leroy Anderson Dam Inundation Study

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LEROY ANDERSON DAM INUNDATION STUDY

1. Introduction

The Santa Clara Valley Water District (District) is currently updating their Emergency Action Plan (EAP) for Leroy Anderson Dam (Anderson Dam). Mead & Hunt Inc. (Mead & Hunt), formerly Ensign & Buckley Consulting Engineers, is assisting the District with this effort by performing the required dam failure inundation analysis. Ensign & Buckley previously prepared a dam failure analysis for Anderson Dam in 1992. Mead & Hunt is updating that analysis in order to meet the current requirements of the Federal Energy Regulatory Commission's (FERC). This report summarizes the approach and results of the new inundation analysis.

2. Background

2.1. Dam Location – Anderson Dam is located in Santa Clara County, California, approximately 11 miles southeast of San Jose and 3 miles north of Morgan Hill. The dam impounds Coyote Creek to form Anderson Lake. (See Figure 1)

2.2. *Dam and Reservoir Description – The dam is a zoned earth-rock embankment with a maximum* height of approximately 240 feet from the streambed to the crest, 1400 feet long and 40 feet wide at the crest elevation of 644.5 feet. The reservoir is approximately 0.25 miles wide and 7.5 miles long. It extends northwest to southeast direction, parallel to the dam. The capacity of the reservoir is 89,076 acre-feet at the spillway crest elevation of 625.0 feet. All elevations referenced in this report are based on the National Geodetic Vertical Datum of 1929 (NGVD29).

2.3. Downstream Conditions – The Santa Clara Valley lies immediately downstream of the dam. The valley extends northwest and southeast from the dam. A grade break occurs in the vicinity of the *dam so that the valley floor slopes away from the dam in either direction. In the event of a dam* failure the flow from the reservoir would be divided, with part going towards San Jose to the northwest and part going towards Gilroy to the southeast. Except for overpass crossings, roads and railroads are close to existing ground elevations. There are slightly elevated railroad embankments at some locations but these would not have a major effect on the flows in the event of a dam failure.

2.3.1. *Area Northwest of the Dam* - The northwest portion of the valley is approximately 2 miles wide near the dam. Approximately 7 miles north from the dam, the valley narrows to approximately 1.3 miles in width. The valley further narrows to approximately *0.4 miles* about 8.5 miles from the dam. This narrowing is caused by Tulare Hill, which juts into the valley. Beyond Tulare Hill, the valley expands westward leaving Coyote Creek, which flows along the east side of the valley, following a straight course. A low hill with a peak elevation of 325 feet separates Coyote Creek from the rest of the valley leaving the hill as an island. The island extends from mile 12 to mile 14.5 northwest of the dam. Another low hill with a peak elevation of 435 forms another island on the left side of the valley

between Capitol Expressway to the south and Tully Road to the north. Coyote Creek rejoins the main valley in the vicinity of the Capitol Expressway near the north end of the first island. Upper Silver Creek flows into Coyote Creek at this location. Approximately 14 miles northwest of the dam, the Guadalupe River emerges from the hills into the valley and it flows approximately 2 miles west of and parallel to Coyote Creek. The valley expands rapidly until it reaches the south end of San Francisco Bay approximately 34 miles downstream of the dam. This portion of the valley is heavily urbanized with dense development occurring between 7 to 27 miles downstream of the dam.

2.3.2. *The Area Southeast of the Dam* - The southeast portion of Santa Clara Valley is approximately 3 miles wide just downstream of Anderson Dam. The valley width increases to approximately 4 miles before a promontory narrows it down to 2 miles at a location 5 miles southeast of the dam. The valley immediately widens to 3 miles beyond the promontory and continues to widen evenly to the San Benito County boundary at the Pajaro River. The southeast valley is drained by Llagas Creek and its tributaries until Gilroy where Uvas Creek enters the valley. The two creeks continue southwards until they join the Pajaro River. Although not as heavily urbanized as the northwest portion of the valley, there are some concentrated areas of development around Morgan Hill and Gilroy.

The Pajaro River flows out of the southern end of the Santa Clara Valley in a narrow gap in the Santa Cruz Mountains referred to as the Pajaro Gap. The river flows through the gap towards the southwest for about 3 miles where it is joined by the San Benito River. From this point the river continues flowing though a relatively narrow canyon in a westerly direction for another 10 miles. It then enters into the wide Pajaro Valley about 6 miles east of Watsonville. The river continues through the valley for about 12 miles until it reaches the Pacific Ocean. Several minor tributaries join the Pajaro River within the valley, the largest being Salsipeudes Creek, which enters the river near Watsonville. This reach is relatively underdeveloped except for the Watsonville area.

3. Previous Studies

The Santa Clara Valley Water District conducted the original dam failure and inundation study for Anderson Dam in 1974. That study was replaced with a study performed by Ensign & Buckley Consulting Engineers in 1992 (Reference 2). The 1992 study has remained in effect until this current effort. Much of the information generated during the 1992 study was utilized for this current study.

4. Study Approach

Current FERC guidelines require two dam failure scenarios to be evaluated. The first scenario is called the "fair weather" failure scenario. This type of failure is assumed to occur when the reservoir is at its normal full pool elevation and normal stream flows are prevailing. FERC considers this type of failure to have the most potential for loss of human life due to the element of surprise. The second scenario is for the Inflow Design Flood (IDF). This scenario occurs during a large storm event that results in high inflows into the reservoir and the streams below the dam. The main difference between the two scenarios is that the IDF scenario will have a higher reservoir pool elevation at the time of the dam failure, which will result in higher outflows from the dam. In addition, because the IDF scenario occurs during a large storm event, local inflows from downstream streams must be considered. If local inflows are significant, they must be added to the outflow from the dam. The basic approach to the study is as follows:

- Determine the pool elevation in the reservoir at the time of the dam failure
- Estimate the outflow hydrograph from the dam breach
- Determine the flow split in the valley downstream of the dam
- Route the outflow hydrograph downstream
- Prepare inundation maps

Detailed descriptions of the analyses for the fair weather and IDF scenarios are provided in the following sections.

5. Analysis of the Fair Weather Dam Failure

The 1992 dam failure study performed by Ensign & Buckley was for a fair weather failure scenario. That study utilized the California Office of Emergency Service's (OES) methodology to determine the dam failure outflow and the National Weather Service's (NWS) DAMBRK program to route the flows downstream. The 1992 study was reviewed to determine whether it remains in compliance with the current FERC guidelines. Much of the data from the previous study was adequate for use with this study. Portions of the study did not meet the current criteria and were updated. Each of the tasks performed for the fair weather failure scenario are described below.

5.1. Determine the Pool Elevation – FERC requirements require the pool elevation for the fair weather scenario to be set at the elevation of the spillway. This requirement has not changed since the last study and no modifications to the spillway elevation have been made since that time. Therefore, a pool elevation of 625.0 feet was used.

5.2. Calculate the Outflow Hydrograph - For the 1992 study, the peak breach outflow from the dam was estimated using the following equation from the OES publication entitled *Sequence of Steps in Inundation Map Preparation (August 1991)*:

Where: $Q_{max} = CH^{2.5}$

Q_{max} = Maximum breach outflow in cubic feet per second (cfs)

C = Coefficient that varies with breach shape

H = Depth of water at one-half reservoir capacity in feet

For an earthen dam that is subject to erosion failure, the OES guidelines assume that half of the reservoir capacity will be required to erode the initial breach to natural ground level. The guidelines recommend using either a trapezoidal or parabolic shape for the dam breach. For the 1992 study, a parabolic breach shape was selected with a top width about three times the depth. For this type of failure, the recommended value of coefficient C is 5.0. At the time of the previous study, the storage capacity of the reservoir at the spillway level was considered to be 91,280 acre-feet and this was the basis of the outflow calculations. The capacity of the reservoir was recalculated in 1998 and was determined to be 89100 acre-feet, which amounts to about a 2% reduction in volume. This volume reduction would slightly raise the starting pool elevation for the outflow calculations, but the difference is too small to be significant. The depth of water at one half of the 1992 capacity (45,640 acre-feet) was estimated to be 142 feet. Based on these values and the above equation, the maximum breach outflow was calculated to be 1.2 million cfs. The shape of the outflow hydrograph was determined by assuming that the hydrograph is an isosceles triangle with peak flow at the apex and the area under the hydrograph equal to the storage volume in the reservoir. Using this assumption, the time base of the hydrograph was estimated to be 1.8 hours and the time to failure was 0.90 hour. The outflow hydrograph is shown on Figure 2. Additional calculation data is provided in Appendix A.

At the time of the original study, the peak outflow value was verified using the National Weather Service (NWS) BREACH computer model. The program was developed specifically for calculating the outflow due to an erosional failure of an earthen dam, such as Anderson Dam. The peak outflow calculated with the BREACH program was 1.18 million cfs, which represents a difference of only 1.7%.

Current FERC guidelines recommend using the NWS DAMBRK (or FLDWAV) program to calculate the outflow from a dam failure. DAMBRK uses a simplified parametric approach that is based on observations of previous dam failures. The BREACH program is a mathematical model that uses the actual physical characteristics of a dam to predict the breach and outflow characteristics. According to the NWS, the BREACH method can provide advantages over DAMBRK since the critical properties of the dam are measurable or can be reasonably estimated. For this study it is felt that the BREACH model provides a reasonable method for estimating the failure outflow. Because the outflow from the previous study was verified with the BREACH program, it is considered to be adequate for the purposes of this study.

Mead & Hunt also compared the breach parameters used for the previous study against current FERC guidelines. The current guidelines recommend that the breach parameters fall within certain ranges. Specifically, the average breach width should be between 1 and 5 times the height of the dam. The side slopes of the breach should be between 1/4 to 1 (horizontal to vertical) and 1 to 1. The time to failure should be between 0.1 and 1.0 hour. The parameters from the previous study all fall within these ranges. Based on this, and the confirmation using the Breach program, it is felt that the outflow hydrograph calculated using the OES method is reasonable. Also, as discussed in the following section, the flow values were increased by 10% in each direction after the flow split was determined in the Santa Clara Valley. This increase provides a reasonable cushion against uncertainties.

5.3. Determine Flow Split - Just downstream of the dam, there is a grade break in the Santa Clara Valley. In the event of a dam failure, the outflow from the reservoir would be split into two different directions. Part of the flow would travel in a northwest direction toward San Jose and San Francisco Bay, while the other part would travel southeast toward Gilroy and the Pajaro River. For the previous study, the conservation of momentum principle was used to estimate the split flow below Anderson Dam. The calculations presented in the report for the 1992 study were reviewed and found to be reasonable. The estimated flow split was 0.55 million cfs to the northwest and 0.65 cfs to the southeast. The previous study provided a hedge against uncertainties by increasing the flow in each direction by 10% and the actual peak flows used in the DAMBRK model were 0.61 million cfs to the northwest and 0.71 million to the southeast. The detailed calculations of the flow split are provided in Appendix B.

5.4. Flow Routing - For the previous study, Ensign & Buckley used the NWS DAMBRK model to route the breach flows downstream. The DAMBRK model is one of the routing models that is currently accepted by FERC. Separate flow routing models were created for the northwest valley (toward San Jose) and the southeast valley (toward Gilroy). Cross sections for both models were taken from USGS topographic maps at 0.5 mile intervals along the length of the valley. In the northwest direction, the flood wave was routed 27.5 miles beginning at the dam and ending at Mud Slough near Milpitas. In the southwest direction, the flood wave was routed for 18.3 miles to the location that the Pajaro River enters a narrow valley as it cuts across the Santa Cruz Mountains. Manning's roughness values were estimated using available maps and from field visits. An average Manning's roughness coefficient of 0.06 was used in the model, which reflects the current level of urbanization within the valley.

For this study, a couple of important changes were made in order to meet current requirements and to improve the accuracy of the study. The first change was made to the DAMBRK model in order to more accurately reflect the potential flooding in the immediate vicinity of the dam. The first cross section downstream from the dam for both the northwest and southeast valleys was located at 0.5 mile downstream from the dam. Upon close review it was felt that a significant portion of these cross sections would not actually provide effective conveyance area, but would only be in a backwater area. This is because the flood wave leaving the dam must make a gradual curve into each direction of the valley. The flood wave cannot make a ninety-degree turn. An estimate of the effective conveyance of each cross section was determined by estimating flow nets from the dam to each of the valley directions. The effective width of each

cross section at mile 0.5 was reduced based on that estimate. The change to the results was minor.

The second significant change affected the limits of the routing. The 1992 inundation analysis ended the flood routing in the northwest valley at a point 27.5 miles downstream. The routing was extended about 6 miles due to routing requirements for the IDF. This is discussed in more detail in Section 6.4. In the southeast valley the previous study ended the routing at the point where the Pajaro River enters a narrow valley as it cuts across the Santa Cruz Mountains (Pajaro Gap). A review of the model results indicated that the flood wave at this location would still pose a threat and the routing needed to be extended downstream in order to comply with FERC requirements. Therefore, the flood routing was extended down the Pajaro River to the Pacific Ocean.

Rather than extend the existing DAMBRK model downstream, it was decided to perform this task using the HEC-RAS unsteady flow model. HEC-RAS represents the state-of-the-art for unsteady flow computer models and is a much more user-friendly model than DAMBRK. In addition, there was a significant amount of cross section data available along the Pajaro River that could be directly imported by HEC-RAS without any reformatting. This data would have required reformatting for use with DAMBRK. FERC staff was consulted and approved the use of the model.

Cross sections along the Pajaro River were obtained from two different sources. An HEC-2 hydraulic model was obtained from the Federal Emergency Management Agency (FEMA) that extended from the mouth of the Pajaro River to a location approximately 15.5 miles upstream near the Pajaro Gap. The lateral limits (widths) of the cross sections from FEMA model were not sufficient to cover the inundation limits from a dam failure; therefore, they were widened using USGS Quad maps. No cross section data was available from the Pajaro Gap upstream to the Santa Clara Valley; therefore, USGS quad maps were used to develop the sections for this 8-mile reach. Cross section spacing varied from 5 feet to 3400 feet, with an average of about 1100 feet.

Preliminary model results indicated that flows would escape out of the Pajaro River valley and into Elkhorn Slough south of Watsonville. Therefore, Elkhorn Slough was added to the HEC-RAS model. Cross sections for 7.7 miles of the slough were developed from USGS quad maps.

Manning's roughness coefficients were set at 0.04 within the main channel and 0.045 for the undeveloped overbank areas. These values were based on the data in the FEMA HEC-2 model. In the developed portions of Watsonville, the overbank areas were set at 0.075 to reflect the potential additional restriction to flow due to structures and vehicles, etc.

5.5. Results of the Fair Weather Analysis – The results of the analysis are described along with those from the IDF scenario in Section 7 below. Summary output data from the fair weather routing models (DAMBRK and HEC-RAS) are provided in Appendix C.

6. Analysis of the Inflow Design Flood Dam Failure

The IDF failure analysis assumes that the dam failure occurs during a large storm event. The IDF is defined as the flood flow above which the incremental increase in water surface elevation due to failure of a dam is no longer considered to present an unacceptable threat to downstream life and property. The upper limit on the IDF is the Probable Maximum Flood (PMF). In the case of Anderson Dam, the District, Mead & Hunt, and FERC concluded that the IDF would be equal to the PMF. This section describes the dam failure analysis for the IDF scenario.

6.1. Determine Pool Elevation – The California Division of Safety of Dams (DSOD) previously developed a general storm PMF covering a period of 72 hours and based on the procedures outlined in *Hydrometeorological Report No. 36, Interim Report, Probable Maximum Precipitation in California* (HMR36) published by the U.S. Department of Commerce. Their evaluation determined that the peak inflow into the reservoir during a PMF would be 60,200 cfs. The DSOD routed the PMF flow through the reservoir assuming that the starting water level was at the spillway crest. The routed peak outflow was determined to be 57,400 cfs and the maximum water surface elevation was calculated to be 642.5 feet. This was used as the starting water surface elevation in the reservoir for the IDF dam failure scenario.

6.2. Calculate Outflow Hydrograph - As mentioned previously, for the 1992 fair weather study, verification of the outflow hydrograph was performed using the NWS BREACH program. Because this model was already configured for use with Anderson Dam, it was determined to be the most appropriate method for calculating the breach outflow for the IDF scenario. The model simply needed to be updated with reservoir data appropriate for the PMF. The BREACH model was revised accordingly and a new outflow hydrograph was determined for the IDF scenario.

The peak outflow hydrograph developed for the IDF scenario is shown on Figure 3. The peak outflow was determined to be 1.49 million cfs, which is 24% higher than the fair weather peak outflow. The peak outflow was checked using the OES equation described in Section 5. The peak outflow predicted from the OES equation is 1.46 million cfs, which is within 2% of the value determined by the BREACH model. Summary output from the BREACH model is provided in Appendix A.

6.3. *Determine Flow Split - The IDF dam failure outflow hydrograph was divided into the northwest* and southeast valleys using the same conservation of momentum principles that were used for the fair weather analysis. The calculations indicate the peak flow of 1.49 million cfs will be divided such that 0.81 million cfs would travel along the southeast valley to the Pajaro River and 0.68 million cfs would travel northwest toward San Jose. An additional 10% was added to these flows to compensate for uncertainties in the estimation of the breach outflow and the flow split. The flows used in the DAMBRK model were 0.89 million cfs (northwest) and 0.75 million cfs (southeast). Flow split calculations are presented in Appendix B.

6.4. Flow Routing - The DAMBRK models that were used to route the fair weather failure outflow through the Santa Clara Valley were also used to route the IDF dam failure outflow. One modification was made to the limits of the model. FERC requires that the flood routing be continued downstream until the flood wave no longer constitutes a threat to life or property. Because the flows from the IDF dam failure scenario are higher than the fair weather scenario, it was necessary to extend the downstream limit of the DAMBRK model by about 6 miles toward San Francisco Bay.

Because the IDF failure scenario occurs when local streams are experiencing high flows, it was necessary to review the potential flows that could be added to the breach outflow by local streams. Local inflows from the Coyote Creek watershed downstream of Anderson Dam were found to be negligible based on flow data provided by the U.S. Army Corps of Engineers (COE). However, the Guadalupe River was determined to be a potential significant contributor of flow. Due to the proximity of the Coyote Creek watershed, in which Anderson Dam is located, and the Guadalupe River watershed, it is possible that the PMF could occur simultaneously in both watersheds. A PMF hydrograph is not available for the Guadalupe River. However, the COE previously developed a Standard Project Flood (SPF) hydrograph for the river. The SPF is a large storm event but the PMF is significantly larger so it was necessary to find a way to approximate a PMF hydrograph. The COE previously compared the total precipitation between the SPF and PMF storm events and determined that the PMF precipitation is about 2.5 times higher in this region (See Figure 4). Based on this information, an approximate hydrograph for the PMF was developed by multiplying the flow values of the SPF hydrograph by 2.5. The resultant PMF hydrograph for the Guadalupe River is presented on Figure 5. There was some concern that this approach may not yield a reasonable approximation of the PMF. However, tests were performed using an HEC-1 hydrologic model for a PMF in another watershed. These tests showed that, for very large storms, the ratio of precipitation totals between two storms can be used to predict the ratio between the peak flows, and to a lesser extent, the total runoff volumes resulting from the rainfall events. It is likely that the results are conservative on the high side, but they are considered adequate for this analysis. Inflows from the Guadalupe River were added to the dam break flood wave at mile 16.0. These inflows increased the flood wave peak flow at this location from about 325,000 cfs to 402,000 cfs, an increase of 24%.

Inflow contributions from the Pajaro River and its tributaries were also evaluated. Again, due to the proximity of the Coyote Creek and the Pajaro River watersheds, it was assumed that a PMF at Anderson Dam would coincide with a PMF on the Pajaro River. A PMF hydrograph is not available for the Pajaro River. However, the COE previously developed a Standard Project Flood (SPF) hydrograph for the Pajaro River near Chittenden, which is located just downstream from the confluence with the San Benito River. A PMF hydrograph was approximated using the same methodology that was used to develop the Guadalupe River PMF hydrograph. That is, the flow values for the SPF were multiplied by a value of 2.5 to obtain the PMF hydrograph. The resultant PMF hydrograph for the Pajaro River is shown on Figure 6.

It was necessary to split the hydrograph into two components; one for the upper Pajaro River, and one for the San Benito River. This was necessary because, upon leaving the Santa Clara Valley, the Pajaro River travels over 2 miles before joining with the San Benito River. The COE,

in their *Interim Report, Pajaro River Basin, California for Flood Control,* state that "present conditions of flooding tend to delay the outflow from the flood plain area (of the upper Pajaro River) such that it reaches its peak discharge at the same time or slightly later that the San Benito River and coincident with peak discharge at Chittenden." They also state that "during floods of standard project magnitude the San Benito River sub area would contribute about an equal volume of water (as the Pajaro)." Based on this, the hydrograph at Chittenden was equally divided between the upper Pajaro River and the San Benito River. The upper Pajaro River hydrograph was then added to the dam failure flood wave just before the flood wave exits the Santa Clara Valley through the Pajaro River gap. The Pajaro River flows increase the peak flood flow from about 90,000 cfs to 168,000 cfs, an increase of 87%. The combined flood wave was then routed with HEC-RAS down to the San Benito River, whose contributions were added to the flood wave. At this location, the flood flow was increased by 48%, from 168,000 cfs to 248,000 cfs. The total combined flood wave was then routed to the Pacific Ocean.

The concurrent inflow for Salsipuedes Creek near Watsonville was considered and was found to be negligible at the time of the peak flood wave. Other small creeks in the vicinity of Watsonville were also found to be unimportant compared to the larger flood wave.

6.5. Results of the IDF Failure Analysis – Results from the IDF failure analysis are discussed in the following section. Summary output from the routing models for the IDF are provided in Appendix D.

7. Inundation Mapping and Results

7.1. Inundation Mapping – After the flood routing was completed for each of the dam failure scenarios, the flood inundation boundaries were plotted on USGS 7.5 minute topographic maps. Because the USGS maps have not been updated recently, they do not reflect the current state of development within the Santa Clara Valley. The District has recently developed orthophotos for the Santa Clara Valley and these were used as the base maps for the inundation mapping. The floodplain lines from the USGS topographic maps were simply transferred onto the orthophotos. For those areas that were not covered by the orthophotos, such as the Pajaro River, the USGS topographic maps were used for the mapping.

The complete map set is provided in Appendix E. The map set consists of 12 sheets including a cover sheet that provides a location map that includes the relative coverage of each map sheet, a second sheet with tables that summarize the results at key cross sections, and 10 sheets showing the inundation limits. Each of the summary tables provided on Sheet 2 contain 9 columns of data, which are described below.

Column 1 – Distance from Dam-Mile: This column lists the distance from the dam to the point of interest in miles. This distance correspondence to the cross section numbers listed on the inundation maps. It is important to note the direction from the dam that the measurement is made (e.g., northwest or southwest) since there can be more than one cross section a given distance from the dam.

Column 2 – Maximum Elevation-Feet: This value is the maximum water surface elevation at the cross section for the given failure scenario.

Column 3 – Maximum Flow-cfs: This value is the maximum flow at the cross section in cubic fee per second for the given failure scenario.

Column 4 – Time Maximum Elevation: This is the amount of time it takes to reach the maximum flood stage after the initial dam failure.

Column 5 – Maximum Velocity FPS: This is the maximum average velocity of the flood wave in feet per second.

Column 6 – Flood Elevation FT: This is an estimate of the elevation at which overbank flooding begins.

Column 7 – Time of Wave Arrival: This is the time it takes for the leading edge of the flood wave to reach the given location after the initial dam failure.

Column 8 – Maximum Depth x Velocity: This is the maximum depth multiplied by the maximum velocity at the given location. This value is considered an indicator of the relative safety hazard posed by the flood wave. When the value is less than 6, then the flood wave is no longer considered a danger to human life according to the California OES (Reference 4).

Column 9 – Maximum Depth - FT: This is the maximum depth of flooding at the given cross section for the given storm.

Based on questions that the District has received from some emergency service agencies, consideration was given to adding an additional column to the table that would have identified the time for the flood depth to reach 3 feet. The thinking was that emergency service personnel are able to operate adequately until the flood depth rises above 3 feet and it would be helpful to know when this depth would be reached. Ten cross sections were sampled and it was found that it only required between 4 to 9 minutes for 3 feet of depth to be achieved after the initial arrival of the flood wave. The time is very short because the flood wave from a dam failure travels quickly. Based on this fact, the 3-foot flood time was not added to the table. It is felt the time of the initial flood wave arrival is a better indicator of imminent danger. However, it should be recognized that the flood wave travel times determined by this study are approximations based on assumed dam failure conditions. Flood wave times, and inundation areas, could differ should an actual failure occur.

Sheets 3 through 12 of the map set present the estimated inundation limits resulting from each of the dam failure scenarios. The fair weather inundation limits are shown with a blue hatch pattern. In areas where the IDF scenario results in additional areas of inundation, these areas are shown with a lighter blue hatch pattern. In many areas, the IDF and fair weather boundaries coincide due to steep terrain. Cross sections are shown on the map and are labeled with the distance from the dam as well as the maximum time and depth of flooding for both of the failure scenarios.

7.2. Results – The current analysis for the fair weather failure scenario did not result in significant changes from the previous analysis within the Santa Clara Valley (The Pajaro River was not previously analyzed). The inundation boundaries within the valley will be virtually unchanged from the previous inundation maps. The one exception is at the northwest end of the valley where the limits of the flood routing were extended by about 6 miles. This extension added a significant amount of additional inundation area. However, the bulk of the area is not urbanized and the flood depths and velocities are very low. Significant portions of San Jose would be inundated as well as portions of the major highways in the area. Most of Morgan Hill would be inundated as well as a large portion of Gilroy. Along the Pajaro, portions of Watsonville would be inundated.

The IDF failure scenario produces significantly higher flows than the fair weather scenario. The outflow from the dam is increased from 1.2 million cfs to 1.49 million cfs. In addition, the Guadalupe, Pajaro, and San Benito Rivers add relatively large flow contributions. Within the Santa Clara Valley, the water surface elevations for the IDF failure scenario are between 0.4 to 7 feet higher than those for the fair weather scenario. The increases do not translate into a significantly wider inundation boundary for most areas. This is due to the fact that the fair weather inundation boundary often extends from one side of the Santa Clara Valley to the other, with relatively steep terrain on either side. A 1 to 7-foot increase in water surface elevation does not translate into a large horizontal distance in steep terrain. In some of the flatter areas of San Jose, the IDF does result in a significant increase in the width of the inundation boundary.

Along the Pajaro River, the difference in flood depths between the fair weather and IDF scenarios ranges between 4 and 21 feet. The largest increases occur in the Pajaro gap, which is very narrow and requires much greater depths to carry the larger IDF flows. However, due to the steep slopes along the edges of the Pajaro gap, there is no discernible difference in the horizontal limits of inundation for the two scenarios in this area. As the Pajaro River emerges from the canyon near Mile 26, the terrain flattens in the overbank areas and significant differences between the two scenarios can be seen. Between Miles 30 and 34 the width of the inundation boundary for the IDF is 1500 to 6000 feet wider than the fair weather scenario. In Watsonville the depth of the IDF flood is over 7 feet higher than the fair weather flood resulting in a significant increase in flooding.

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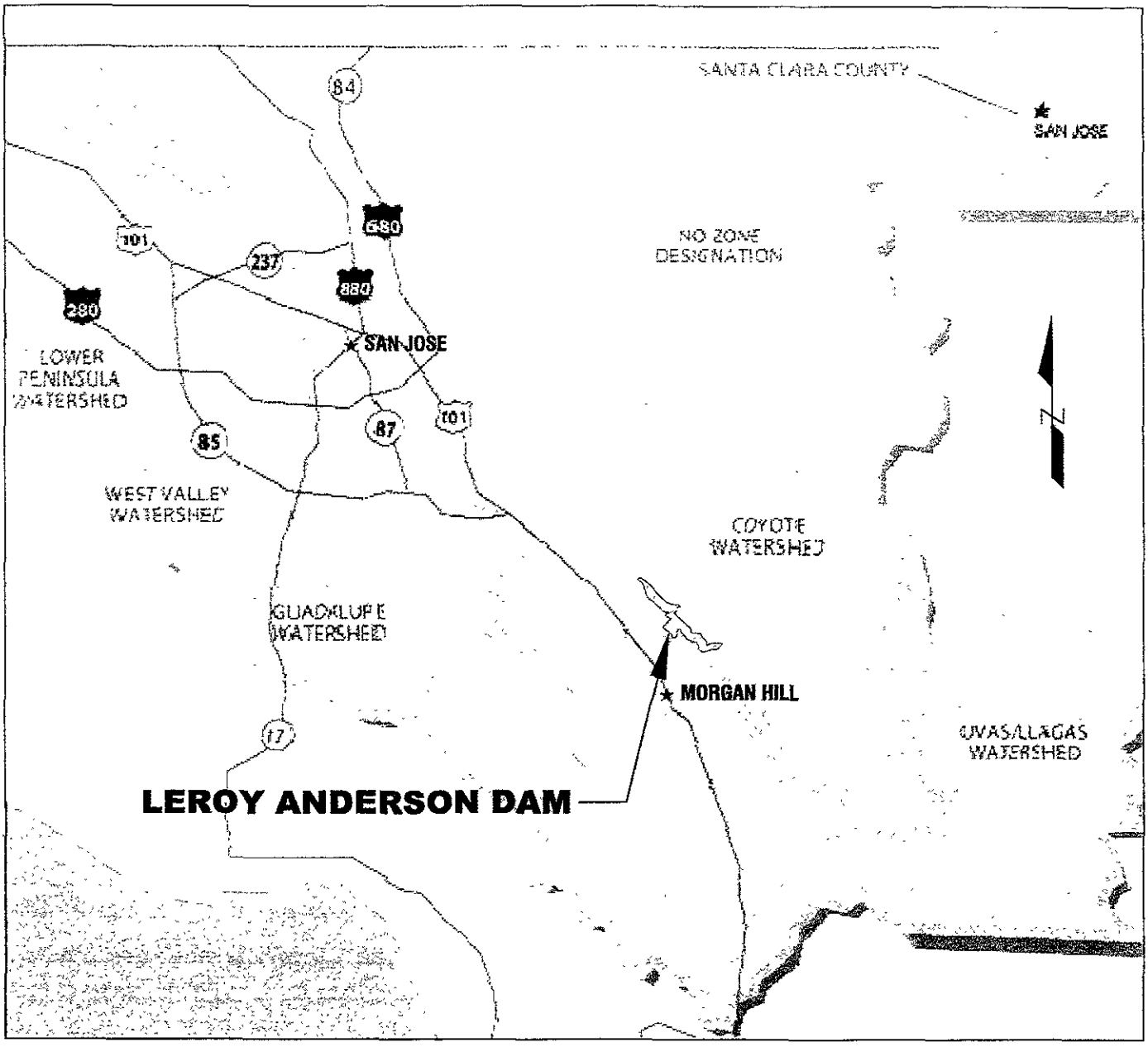
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NTS

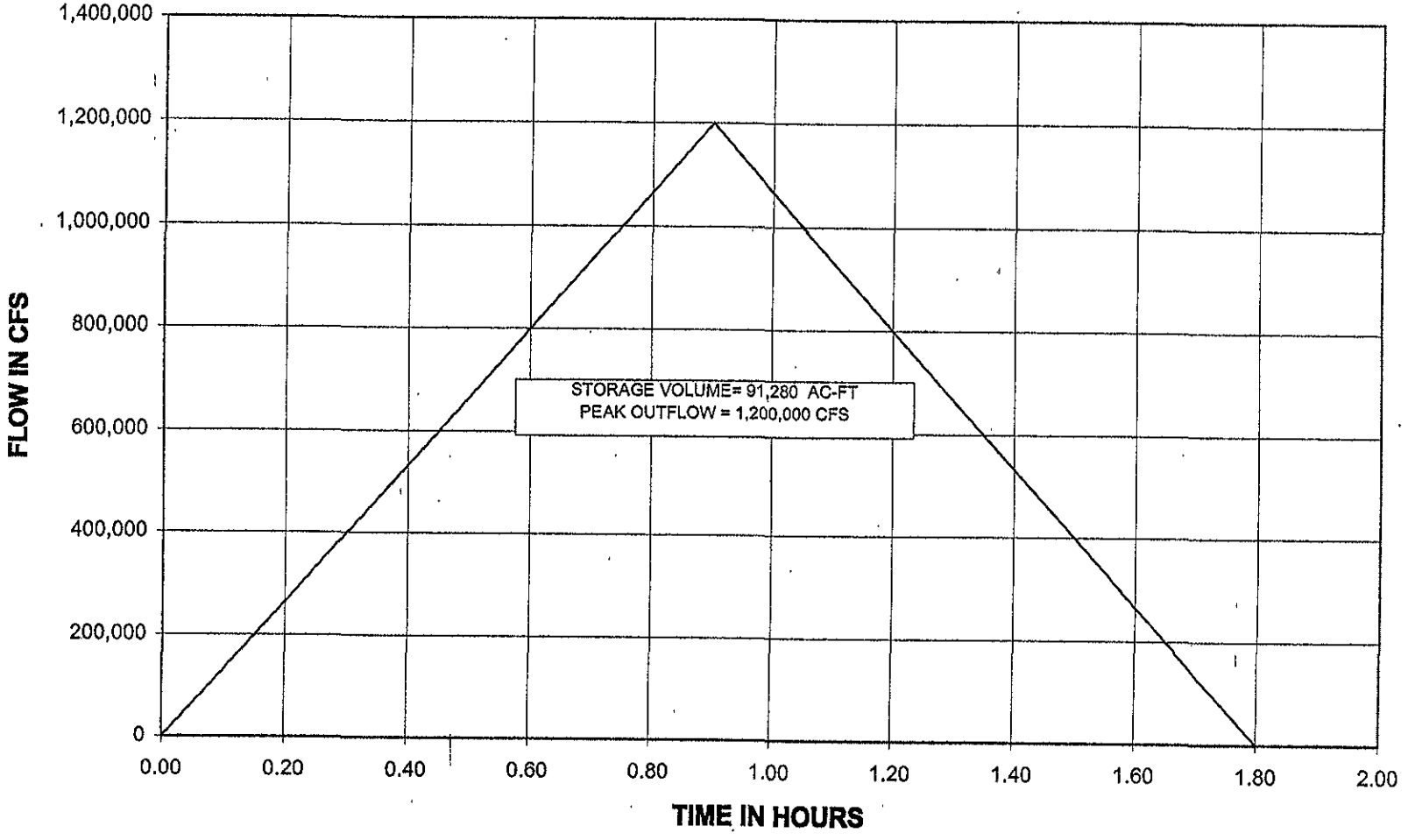
MEAD & HUNT ENGINEERS ARCHITECTS SCIENTISTS PLANNERS
3327 Longview Drive North Highlands, California 95660
Phone: (916) 971-3961 Fax: (916) 971-0578
JUNE 2003

LEROY ANDERSON DAM
INUNDATION STUDY
LOCATION MAP

FIGURE 1

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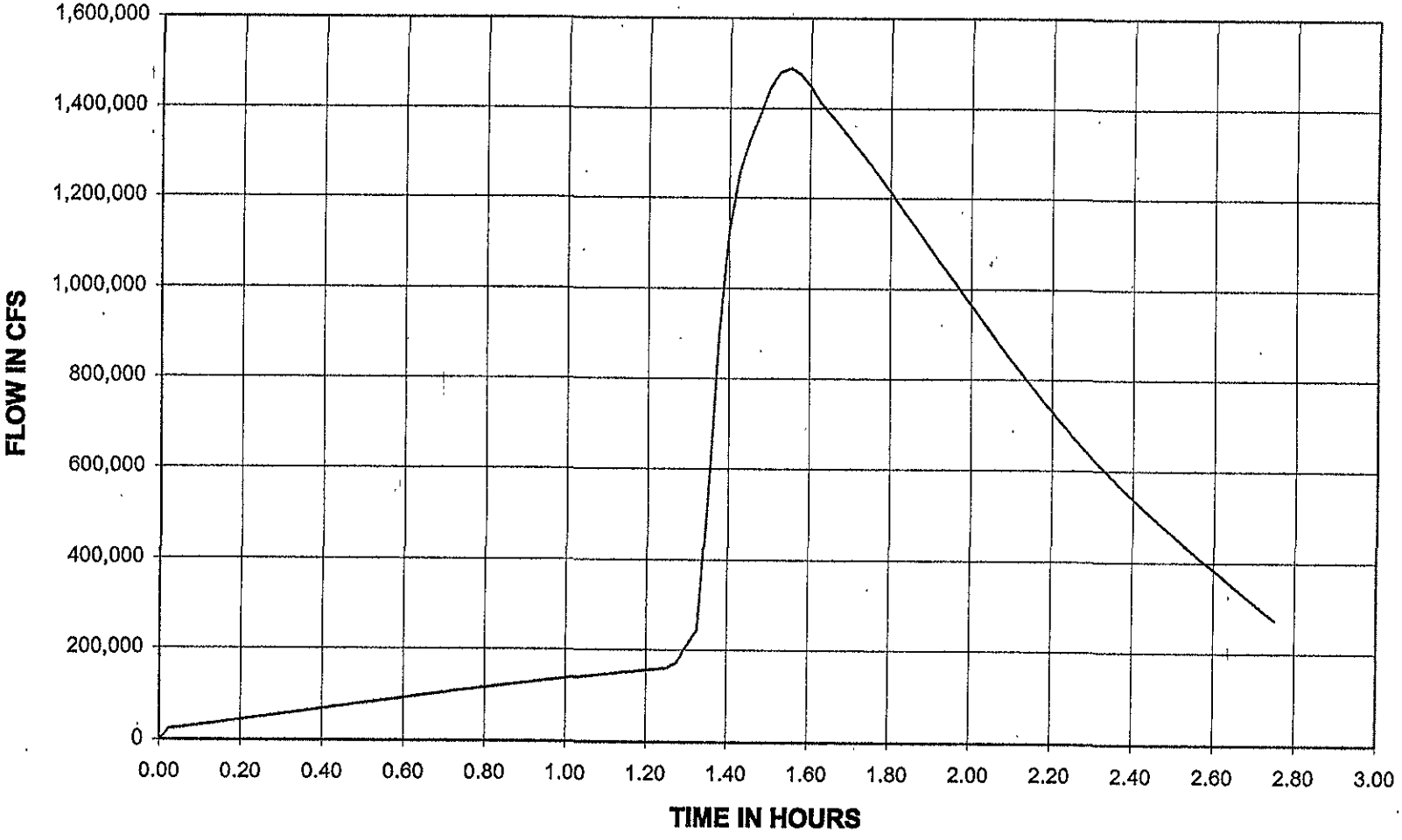
LEROY ANDERSON DAM EAP UPDATE
"FAIR WEATHER BREACH" OUTFLOW HYDROGRAPH



Breach(2).xls FIGURE 2 3/11/03 9:42 AM

FIGURE 2

LEROY ANDERSON DAM EAP UPDATE
INFLOW DESIGN FLOOD OUTFLOW HYDROGRAPH



Breach(2).xls FIGURE 3 3/11/03 9:42 AM

FIGURE 3

COMPARISON OF SPS AND PMP FOR 72 HOURS AND 1000 SQUARE MILES

(Source: Hydrometeorological Report No. 36, Figure 8-9)

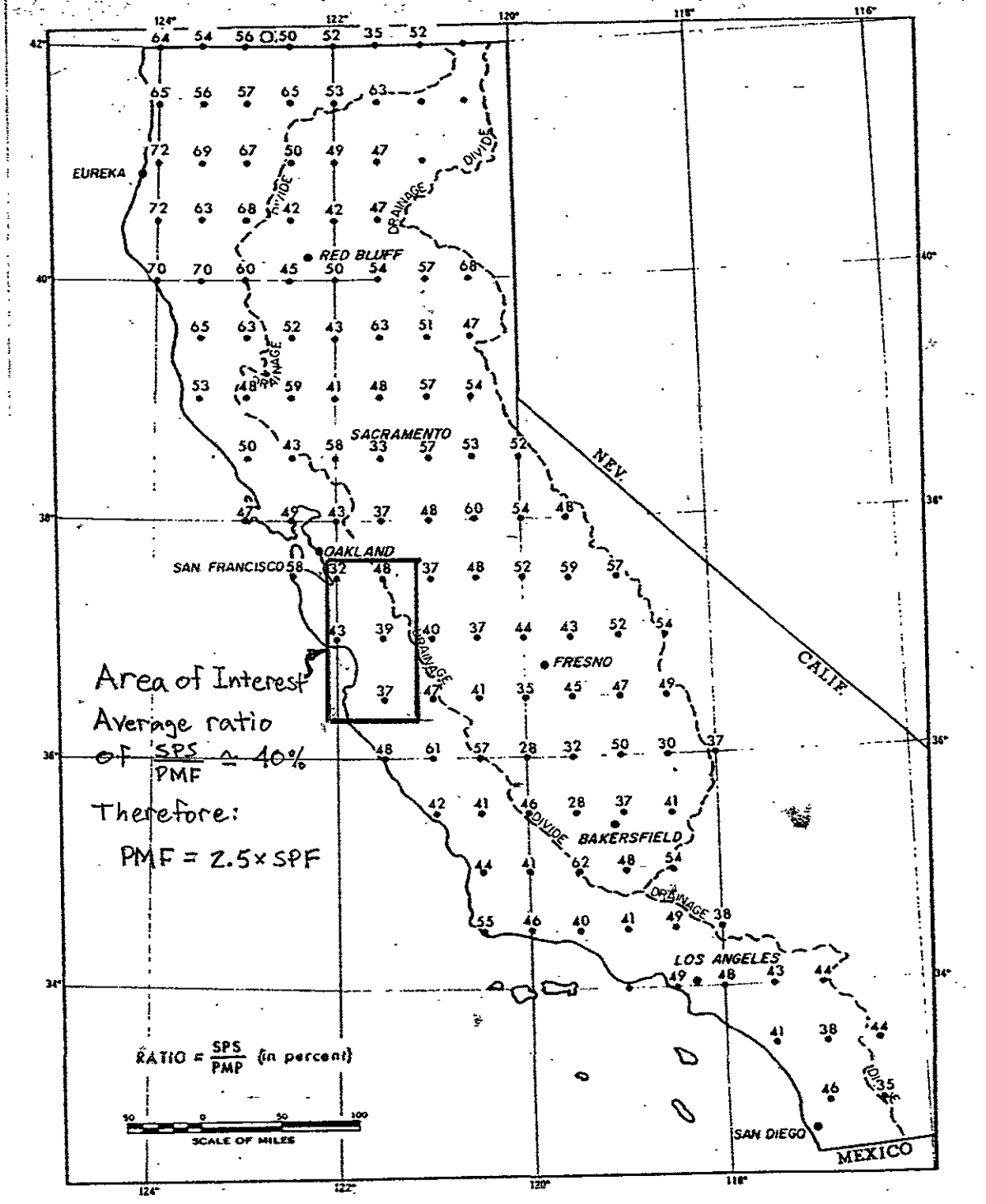
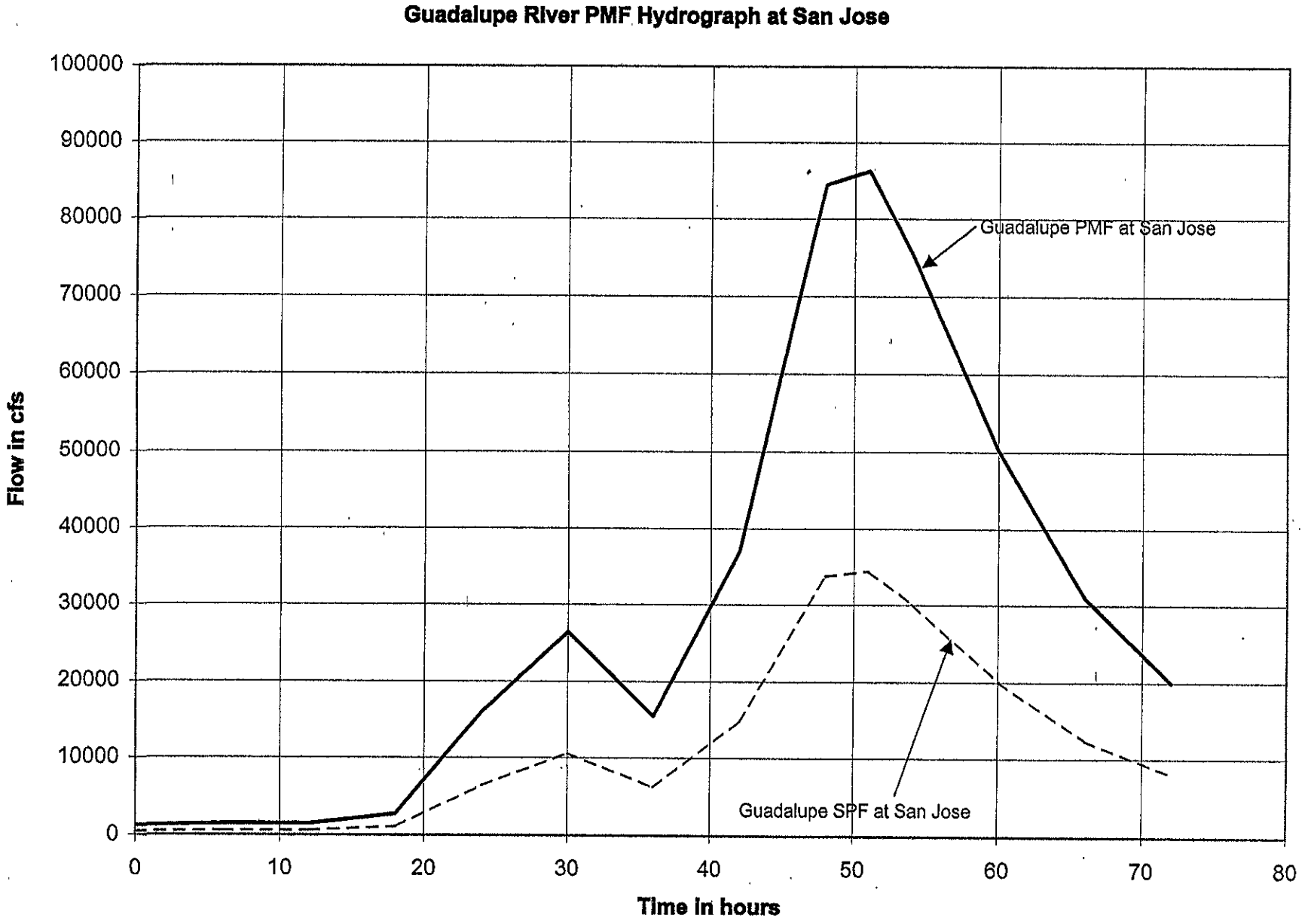


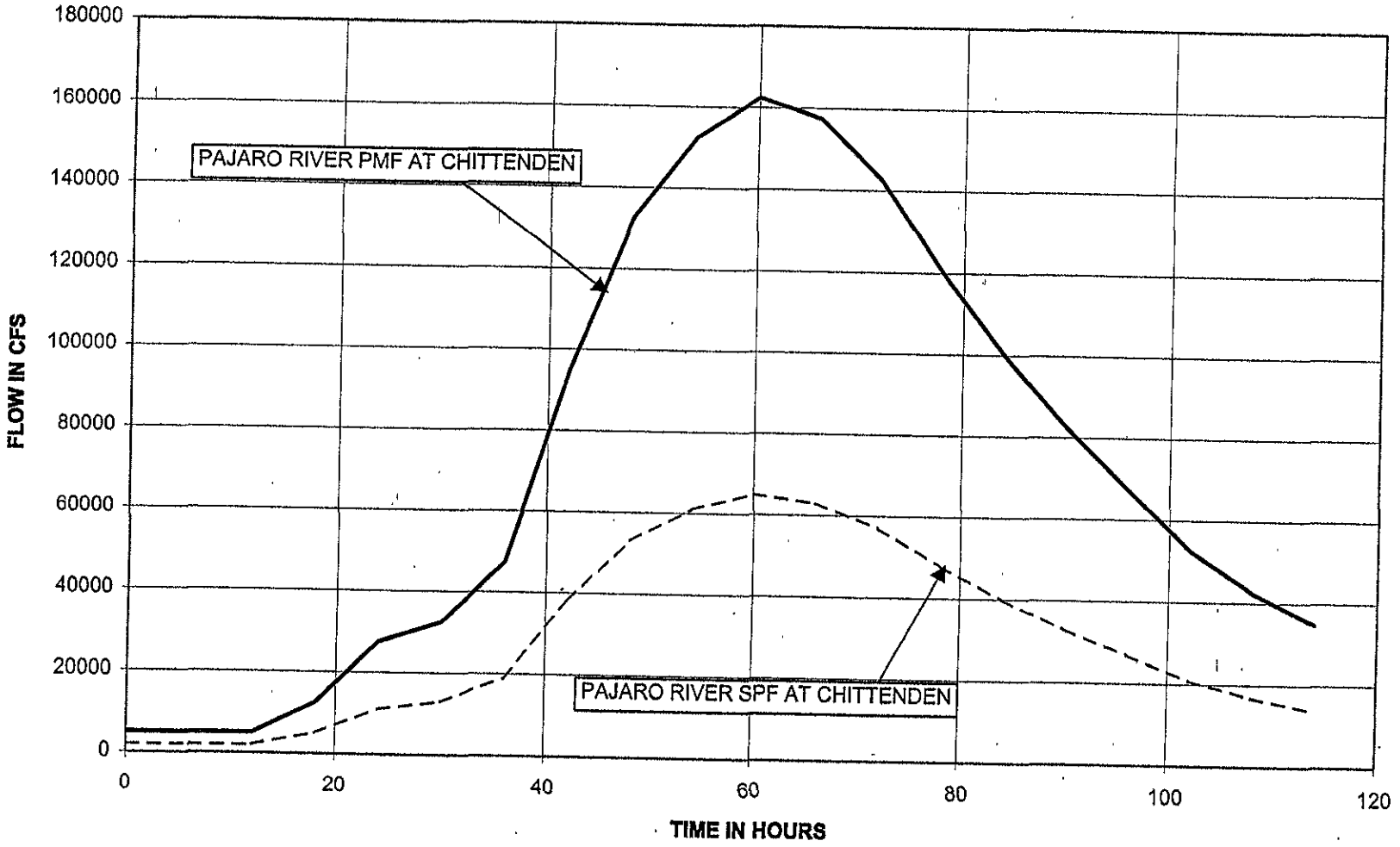
Figure 4



AndersonPMF.xls FIGURE 5 3/11/03 9:42 AM

FIGURE 5

PAJARO RIVER PMF HYDROGRAPH AT CHITTENDEN



AndersonPMF.xls FIGURE 6 3/11/03 9:42 AM

FIGURE 6

APPENDIX A

Outflow Hydrograph Calculations

A1. Fair Weather Outflow Calculations

A2. IDF Outflow – BREACH Output Summary

Appendix A1.

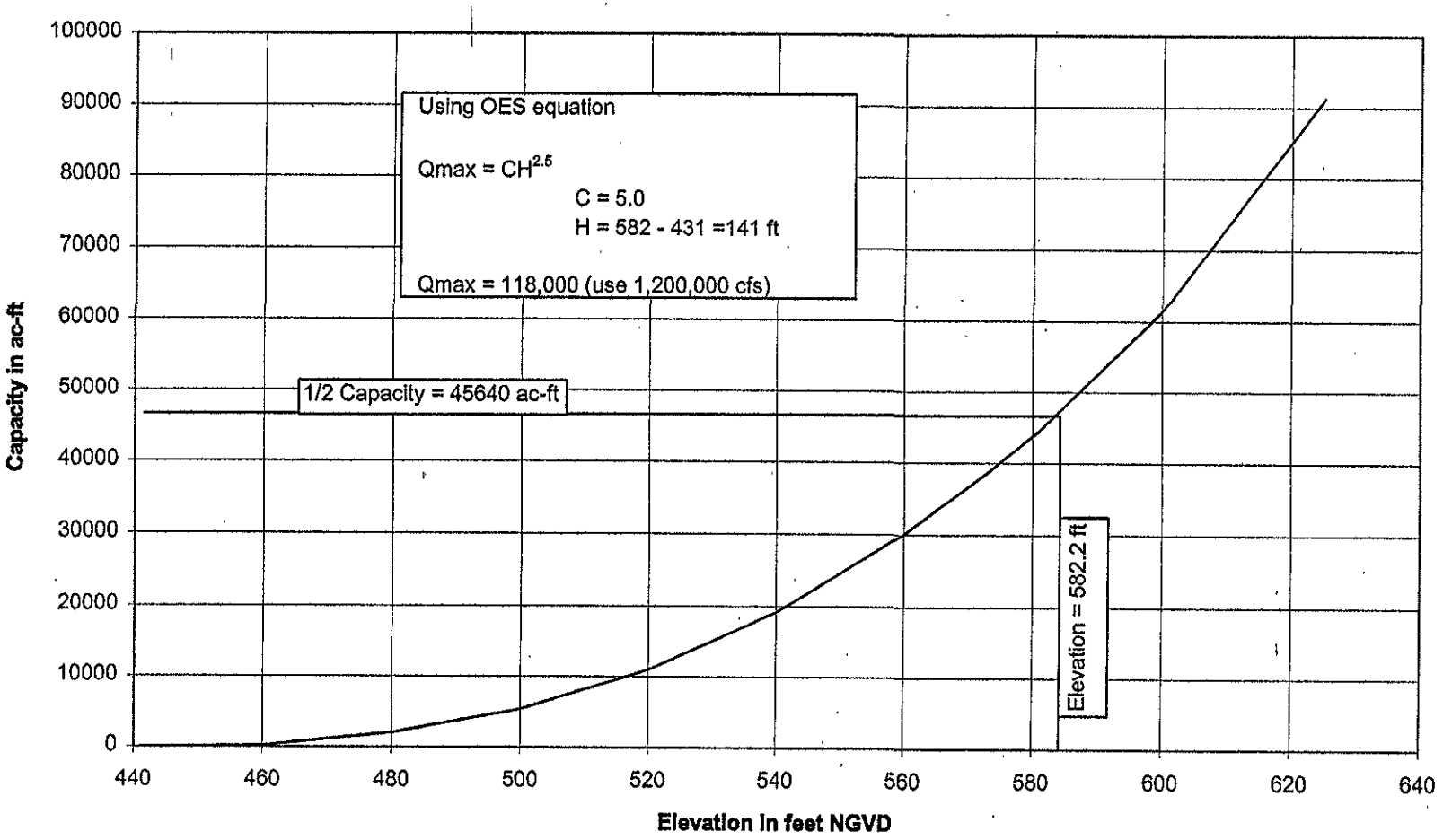
Fair Weather Outflow Calculations

Leroy Anderson Dam EAP Update

Reservoir Elevation-Capacity relationship

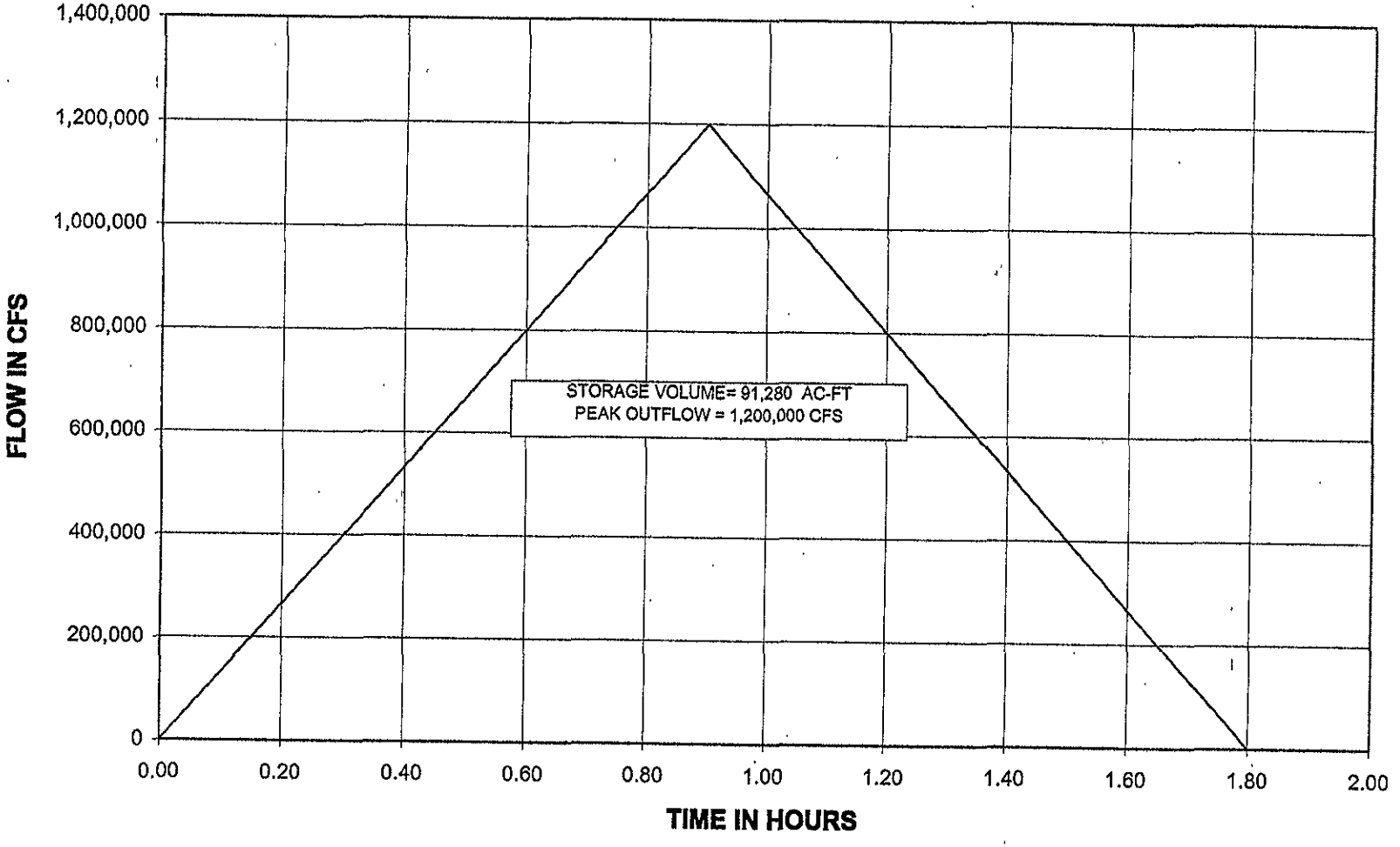
Elevation (ft NGVD)	Capacity (ac-ft)
441	0
460	222
480	1984
500	5334
520	11013
540	19166
560	30120
573	38787
581	44536
582.2	45640
600	61459
625	91280

Leroy Anderson dam EAP Update
Elevation - Capacity Relationship



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LEROY ANDERSON DAM EAP UPDATE
"FAIR WEATHER BREACH" OUTFLOW HYDROGRAPH



Breach(2).xls FIGURE 1 3/11/03 4:50 PM

FIGURE 1

Appendix A2.

IDF Outflow – BREACH Output Summary

Anderson Dam EAP
BREACH Model Output For IDF Scenario

OUTPUT SUMMARY

QBP	MAX OUTFLOW(CFS) THRU BREACH	1488720.
TP	TIME(HR) AT WHICH PEAK OUTFLOW OCCURS	1.55
QP	MAX TOTAL OUTFLOW(CFS) OCCURRING AT TIME TP	1488720.
TRS	DURATION(HR) OF RISING LIMB OF HYDROGRAPH	1.55
TB	TIME(HR) AT WHICH SIGN. RISE IN OUTFLOW STARTS	.00
BRD	FINAL DEPTH(FT) OF BREACH	213.50
BRW	TOP WIDTH(FT) OF BREACH AT PEAK BREACH FLOW	496.33
HU	ELEV(FT) OF TOP OF DAM	644.50
HY	FINAL ELEV(FT) OF RESERVOIR WATER SURFACE	476.97
HC	FINAL ELEV(FT) OF BOTTOM OF BREACH	431.000
AGL	ACUTE ANGLE THAT BREACH SIDE MAKES WITH VERTICAL AT QBP	46.875
QO	OUTFLOW (CFS) AT T=0.0	.2461
Z	SIDE SLOPE OF BREACH (FT/FT) AT PEAK BREACH FLOW	1.07
TFH	TIME OF FAILURE (HR) WHICH IS LINEAR EQUIVALENT OF TRS OBTAINED BY USING SIMPLIFIED DAM-BREAK DISCHARGE EQUATION	1.35
TFHI	TIME OF FAILURE (HR) WHICH IS LINEAR EQUIVALENT OF TRS OBTAINED BY INTEGRATING QB VS TIME FROM T=0 TO T=TP	.46
BO	BOTTOM WIDTH (FT) OF BREACH AT PEAK BREACH FLOW	50.70

APPENDIX B

Flow Split Analysis

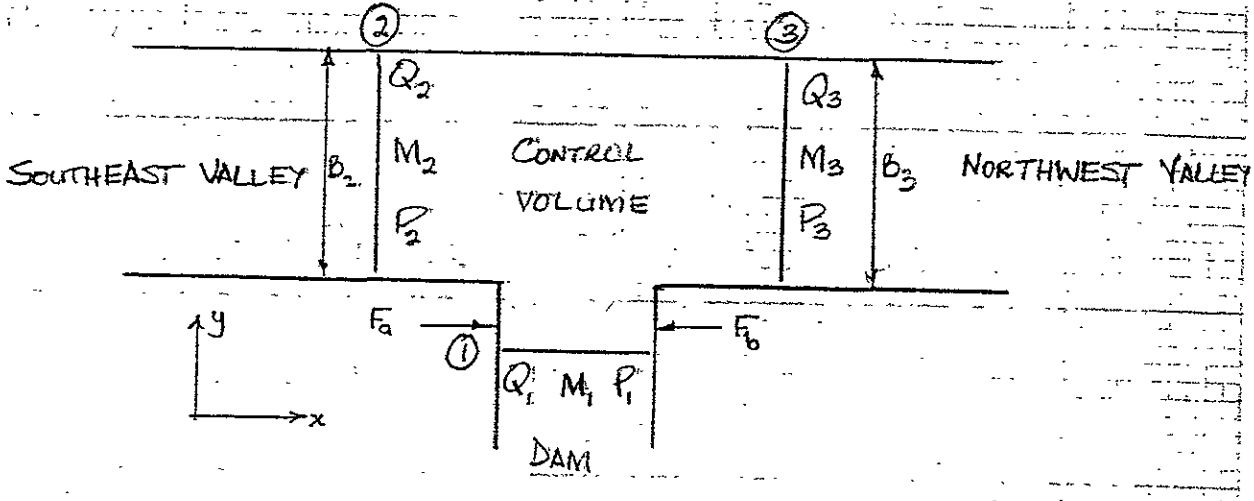
ENSIGN & BUCKLEY
CONSULTING ENGINEERS
• SACRAMENTO •

SHEET 1 OF

PROJECT LEROY ANDERSON DAM INUNDATION STUDY

FEATURE FLOW ROUTING BY BAT DATE 8/14/91

ITEM SPLIT FLOW ANALYSIS CHECKED J.B. DATE 9/14/91



Q_1 = TOTAL PEAK FLOW FROM RESERVOIR

M_1 = MOMENTUM OF FLOW FROM RESERVOIR ON CONTROL VOLUME

P_1 = FORCE ACTING ON CONTROL VOLUME BY FLOW FROM RESERVOIR

Q_2 = PEAK FLOW TRAVELING SOUTHEAST

M_2 = MOMENTUM OF Q_2 ACTING ON CONTROL VOLUME

P_2 = FORCE ACTING ON CONTROL VOLUME BY Q_2

Q_3 = PEAK FLOW TRAVELING NORTHWEST

M_3 = MOMENTUM OF Q_3 ACTING ON CONTROL VOLUME

P_3 = FORCE ACTING ON CONTROL VOLUME BY Q_3

F_a & F_b = FORCES ACTING ON CONTROL VOLUME BY CHANNEL WALLS

USING THE CONSERVATION OF MOMENTUM PRINCIPLE IN THE x-DIRECTION

$$M_{1x} + M_{2x} - M_{3x} + P_{1x} + P_{2x} - P_{3x} + F_{ax} - F_{bx} + WS_o - \tau = 0$$

$M_{1x} = 0$ (No component in x-direction)

$$M_{2x} = \frac{\rho Q_2^2}{B_2 y_2}$$

WHERE ρ = DENSITY OF WATER
B_2 = TOP WIDTH OF VALLEY AT BOUNDARY OF CONTROL VOLUME IN SOUTHEAST DIRECTION (2)
y_2 = HYDRAULIC DEPTH AT (2)

$$M_{3x} = \frac{\rho Q_3^2}{B_3 y_3}$$

WHERE B_3 = TOP WITH AT BOUNDARY (3)
y_3 = HYDRAULIC DEPTH AT (3)

$P_{1x} = 0$ (No component in x-direction)

$$P_{2x} = \frac{\gamma y_2^2 B_2}{2}$$

WHERE γ = SPECIFIC WEIGHT OF WATER

$$P_{3x} = \frac{\gamma y_3^2 B_2}{2}$$

Assume $F_{ax} = F_{ay}$

AND $WS_o = \tau$

WHERE WS_o = GRAVITATIONAL FORCE
τ = BOUNDARY SHEAR

$$M_{2x} - M_{3x} + P_{2x} - P_{3x} = 0$$

$$\frac{\rho Q_2^2}{B_2 y_2} - \frac{\rho Q_3^2}{B_3 y_3} + \frac{\gamma y_2^2 B_2}{2} - \frac{\gamma y_3^2 B_3}{2} = 0$$

$$\frac{\rho Q_2^2}{B_2 y_2} + \frac{\gamma y_2^2 B_2}{2} = \frac{\rho Q_3^2}{B_3 y_3} + \frac{\gamma y_3^2 B_3}{2}$$

Since $\gamma = \rho g$

and $B_2 y_2 = A_2$

and $B_3 y_3 = A_3$

$$\frac{\rho Q_2^2}{A_2} + \frac{\rho g y_2 A_2}{2} = \frac{\rho Q_3^2}{A_3} + \frac{\rho g y_3 A_3}{2}$$

Let $Q_3 = C - Q_2$ where $C = 1200000$ cfs

$$\frac{Q_2^2}{A_2} + \frac{g y_2 A_2}{2} = \frac{(C - Q_2)^2}{A_3} + \frac{g y_3 A_3}{2}$$

or

$$\boxed{M_2 + F_2 = M_3 + F_3}$$

Plot Q vs. $F + M$ for each side

LEROY ANDERSON DAM INUNDATION STUDY

TABLE B-1: HYDRAUULIC PARAMETERS FOR NORTHWEST VALLEY CROSS SECTION 0.5

Q3	A3	B3	Y3	F3+M3
10000	5106	2046	2.50	224740
50395	11462	3066	3.74	911453
90790	19194	3967	4.84	1924632
171580	31551	4361	7.23	4608156
257370	41905	4592	9.13	7737511
343160	51633	4800	10.76	11222785
428951	61829	5008	12.35	15265767
514741	71173	5342	13.32	18989695
600531	81026	5818	13.93	22618628
686321	91195	6273	14.54	26509984
772111	100876	6676	15.11	30450389
857902	110435	7052	15.66	34508222
943692	119614	7395	16.17	38594783
1029482	128569	7715	16.66	42738805
1115272	136907	7928	17.27	47149153
1201063	144726	8094	17.88	51630976
1286853	152070	8246	18.44	56040896
1372643	159081	8390	18.96	60406403
1458438	165860	8526	19.45	64771725
1544224	172507	8657	19.93	69167541

Q3 = SPLIT FLOW TRAVELLING NORTHWEST
A3 = CROSS SECTION AREA
B3 = CROSS SECTION TOP WIDTH
Y3 = HYDRAULIC DEPTH = A3/B3
F3+M3 = FORCE AND MOMENTUM ACTING ON CONTROL VOLUME

LEROY ANDERSON DAM INUNDATION STUDY

TABLE B-2: HYDRAULIC PARAMETERS
FOR SOUTHEAST VALLEY
CROSS SECTION 0.5

Q2	A2	B2	Y2	F2+M2
10000	12325	4308	2.86	575820
50395	18757	4494	4.17	1395767
90790	25188	4680	5.38	2509818
171580	41651	5117	8.14	6165168
257370	52725	5391	9.78	9558451
343160	64195	5745	11.17	13383229
428951	76870	6171	12.46	17810078
514741	89410	6565	13.62	22568249
600531	101027	6909	14.62	27353752
686321	113033	7249	15.59	32543712
772111	124464	7578	16.42	37702123
857902	136300	7989	17.06	42838903
943692	148361	8386	17.69	48260773
1029482	160297	8762	18.29	53825969
1115272	171990	9115	18.87	59480713
1201063	183421	9448	19.41	65194992
1286853	194272	9749	19.93	70855716
1372643	205123	10049	20.41	76596611
1458438	215359	10317	20.88	82256572
1544224	225594	10584	21.31	87986512

Q2 = SPLIT FLOW TRAVELING SOUTHEAST
A2 = CROSS SECTION AREA
B2 = CROSS SECTION TOP WIDTH
Y2 = HYDRAULIC DEPTH =A2/B2
F2+M2 = FORCE AND MOMENTUM ACTING ON CONTROL VOLUME

PROJECT LEROY ANDERSON DAM

FEATURE SPLIT FLOW BY BAT DATE 8/13/91

ITEM MOMENTUM ANALYSIS CHECKED J.B. DATE 8/14/91

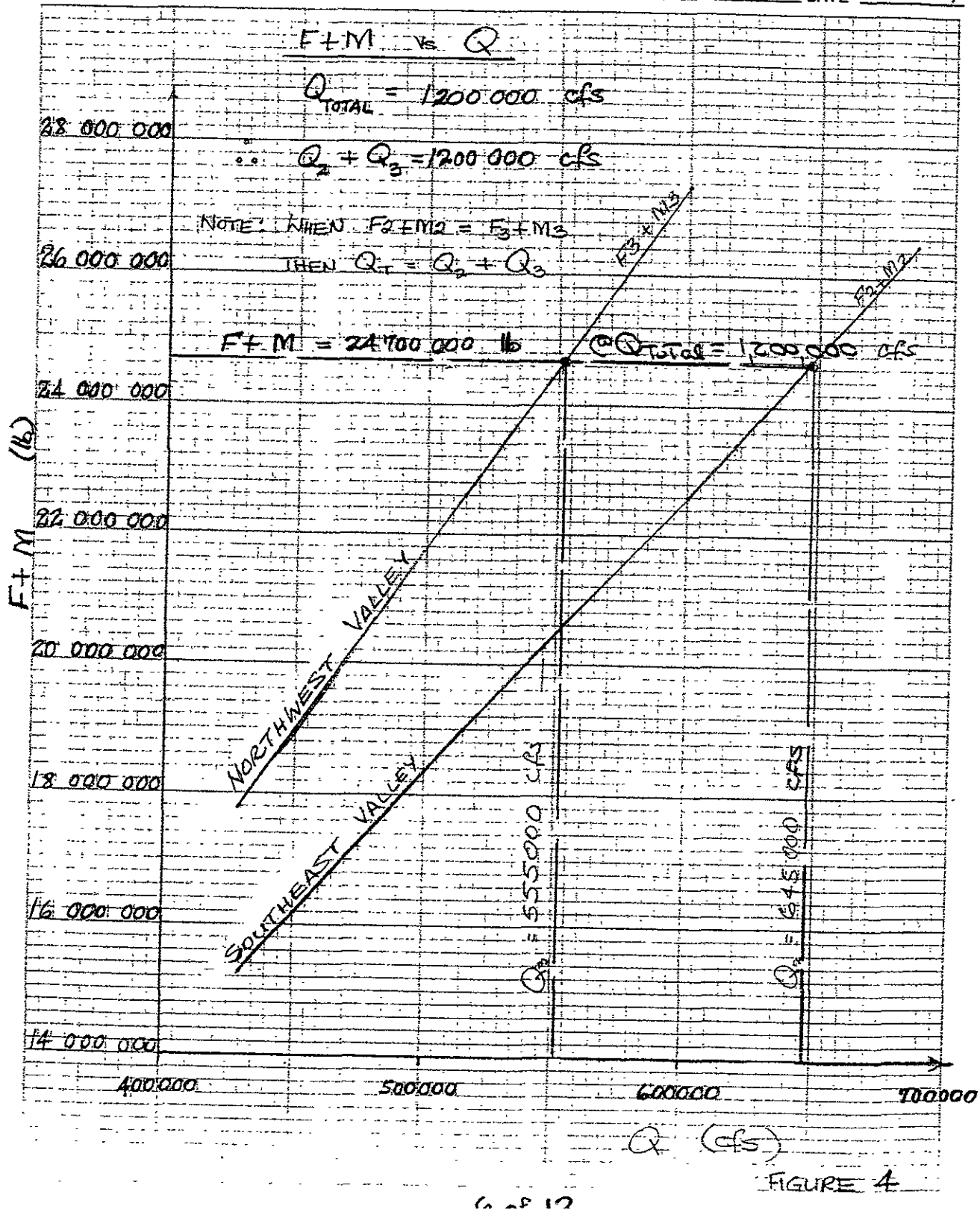


FIGURE 4

From Q vs. F+M CURVES

Q_2 = 645 000 cfs

Q_3 = 555 000 cfs

Q_{TOTAL} = 1200 000 cfs

Increase Q_2 and Q_3 by 10% to compensate for uncertainties

$Q_2 + 10\% Q_2$ = 709,500 cfs

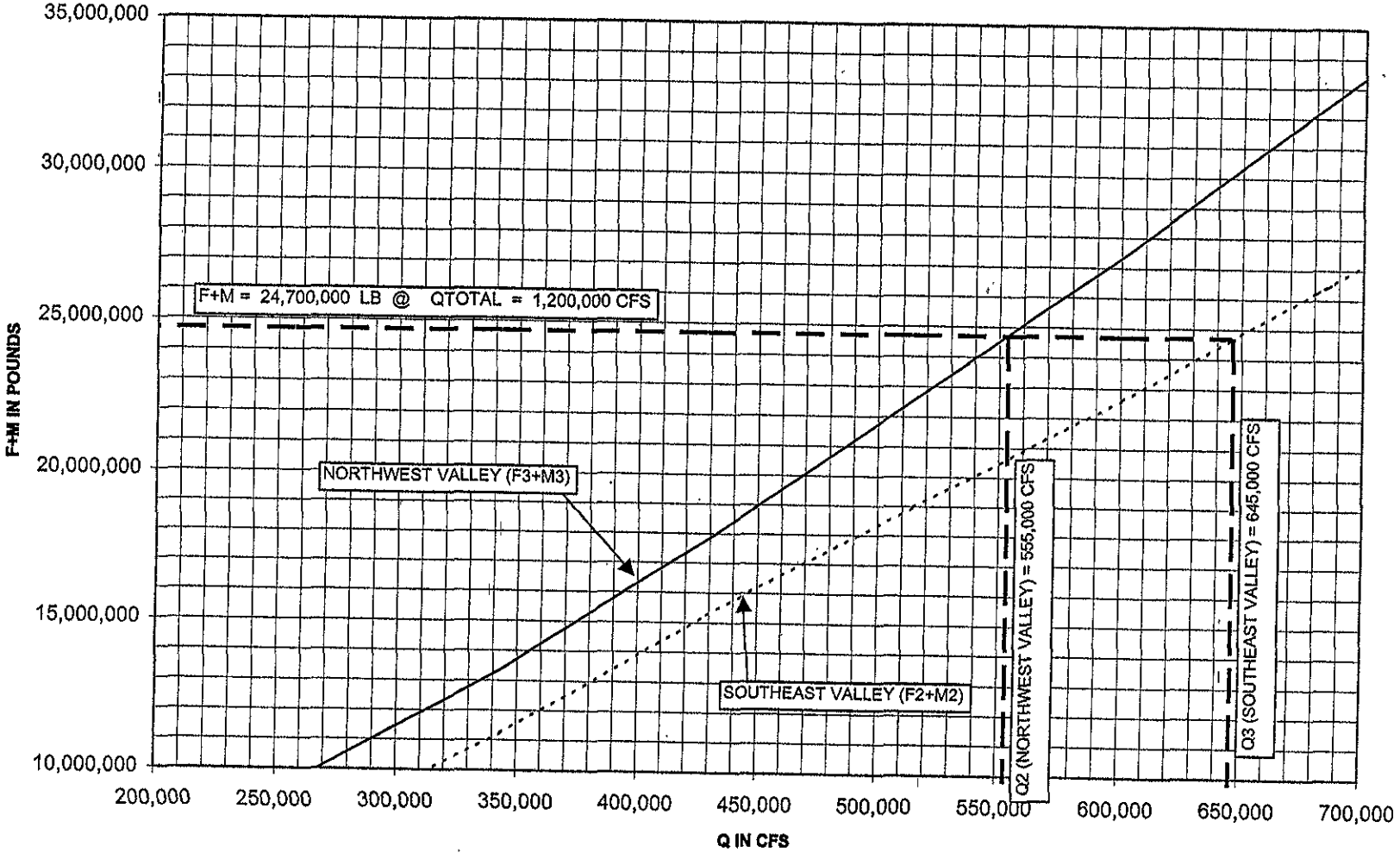
Use 710,000 cfs for southeast valley

$Q_3 + 10\% Q_3$ = 610,500 cfs

Use 611 000 cfs for northwest valley

LEROY ANDERSON DAM EAP UPDATE			
"FAIR WEATHER" BREACH SPLIT FLOW ANALYSIS			
Q	F2+M2	F3+M3	Remarks
10000	575820	224740	
50395	1395767	911453	
90790	2509818	1924632	
171580	6165168	4608156	
257370	9558451	7737511	
343160	13383229	11222785	
428951	17810078	15265767	
514741	22568249	18989695	
555000	24813960	20692658	NW Valley
600531	27353752	22618628	
645000	30043953	24635701	SE Valley
686321	32543712	26509984	
679500	32133577	26196690	
772111	37702123	30450389	
808752	39896022	32183474	
857902	42838903	34508222	
943692	48260773	38594783	
1029482	53825969	42738805	
1115272	59480713	47149153	
1201063	65194992	51630976	
1286853	70855716	56040896	
1372643	76596611	60406403	
1458438	82256572	64771725	
1544224	87986512	69167541	

LEROY ANDERSON DAM EAP UPDATE
SPLIT FLOW FOR "FAIR WEATHER" BREACH USING MOMENTUM ANALYSIS

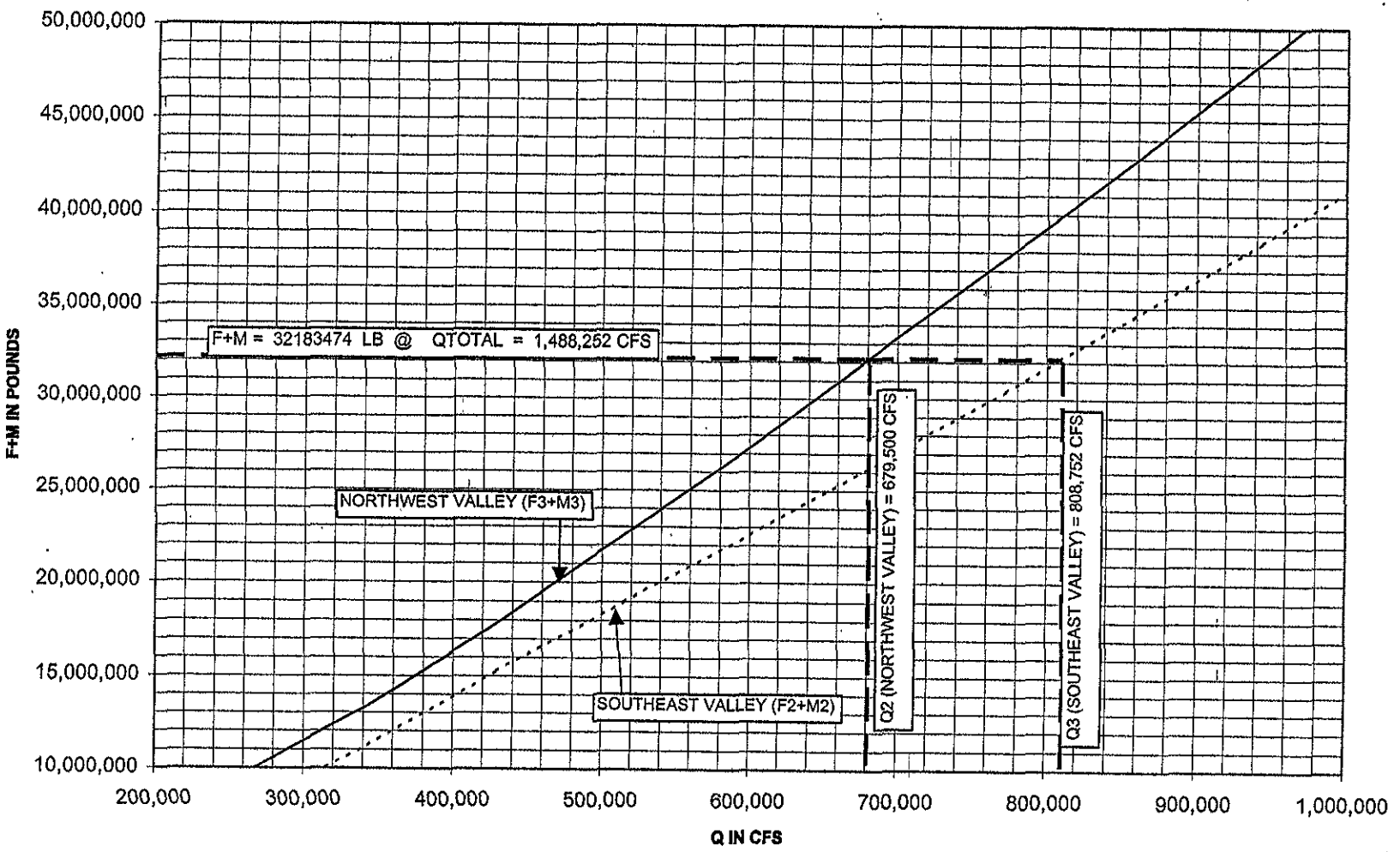


Breach(2).xls FW SPLIT CHART 4/21/03 12:10 PM

FIGURE 4

LEROY ANDERSON DAM EAP UPDATE			
IDF SPLIT FLOW ANALYSIS			
Q	F2+M2	F3+M3	Remarks
10000	575820	224740	
50395	1395767	911453	
90790	2509818	1924632	
171580	6165168	4608156	
257370	9558451	7737511	
343160	13383229	11222785	
428951	17810078	15265767	
514741	22568249	18989695	
600531	27353752	22618628	
686321	32543712	26509984	
679500	32133577	26196690	NW Valley
772111	37702123	30450389	
808752	39896022	32183474	SE Valley
857902	42838903	34508222	
943692	48260773	38594783	
1029482	53825969	42738805	
1115272	59480713	47149153	
1201063	65194992	51630976	
1286853	70855716	56040896	
1372643	76596611	60406403	
1458438	82256572	64771725	
1544224	87986512	69167541	

LEROY ANDERSON DAM EAP UPDATE
SPLIT FLOW FOR IDF USING MOMENTUM ANALYSIS



21 of 11

Breach(2).xls IDF SPLIT CHART 4/21/03 12:10 PM

FIGURE 4

LEROY ANDERSON DAM EAP UPDATE
PMF SPLIT FLOW ANALYSIS

FROM FIGURE –

Q2	=	808,752	CFS
Q3	=	679,500	CFS
QTOTAL	=	1,488,252	CFS

Increase Q2 and Q3 by 10% to compensate for uncertainties

Q2 + 10% Q2	=	889,627	CFS
	Use	890,000 cfs	for southeast valley
Q3 + 10% Q3	=	747,450	CFS
	Use	747,000 cfs	for northwest valley

APPENDIX C

Routing Results for Fair Weather Scenario

C1. Fair Weather DAMBRK Output – Northwest Valley

C2. Fair Weather DAMBRK Output – Southeast Valley

C3. HEC-RAS Output – Pajaro River

Appendix C1.

Fair Weather DAMBRK Output – Northwest Valley

DAMBRK Summary Output
Fair Weather Failure
Northwest Valley

Input File: NW-Task1.I
Output File: NW-Task1.O

PROFILE OF CRESTS AND TIMES FOR EAP TASK1 UPDATE NW
BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE ********	MAX ELEV FEET ********	MAX FLOW CFS ********	TIME MAX ELEV-HRS ********	MAX VEL FPS ********	FLOOD ELEV FEET **********	TIME FLOOD ELEV-HRS **********
.500	425.57	594000	2.125	14.40	410.00	1.27
1.000	405.30	594572	2.125	13.24	395.00	1.37
1.500	393.10	586054	2.175	7.75	380.00	.00
2.000	374.86	580780	2.225	11.25	370.00	1.62
2.500	354.80	571904	2.275	8.24	340.00	1.67
3.000	342.79	558850	2.375	8.09	326.67	1.72
3.500	330.78	548033	2.425	8.29	313.33	1.57
4.000	320.59	535847	2.525	7.10	300.00	.00
4.500	311.19	519729	2.625	7.60	290.83	.00
5.000	301.20	507144	2.675	8.07	281.67	.00
5.500	290.97	498634	2.775	8.37	272.50	.00
6.000	281.31	492860	2.825	8.03	263.33	.00
6.500	272.22	483487	3.175	8.45	254.17	.00
7.000	270.83	431141	3.275	5.48	245.00	.00
7.500	269.75	364874	3.325	6.06	243.33	.00
8.000	267.91	339723	3.375	6.25	241.67	.00
8.500	263.06	332886	3.425	10.28	240.00	.00
9.000	255.23	327132	3.475	10.64	230.71	.00
9.500	248.40	317562	3.725	11.16	221.43	.00
10.000	241.46	291529	3.875	11.77	212.14	.00
10.500	232.12	277976	4.025	12.32	202.86	.00
11.000	221.21	265048	4.325	12.74	193.57	.00
11.500	207.10	259888	4.275	8.11	184.29	.00
12.000	196.27	247500	4.725	5.55	175.00	.00
12.500	189.81	227946	5.075	5.14	170.00	.00
13.000	181.83	220202	5.225	5.54	165.00	.00
13.500	172.03	213649	5.725	7.10	161.00	.00
14.000	167.68	206593	5.725	3.67	155.00	.00
14.500	164.07	204029	6.325	6.62	150.00	.00
15.000	162.50	178516	6.375	8.02	150.00	5.28
15.500	158.32	179627	6.325	13.83	150.00	5.63
16.000	140.30	179244	6.625	6.32	135.00	5.83
16.500	131.80	176981	6.825	4.32	121.75	2.22
17.000	124.24	174454	7.025	3.91	108.50	.00
17.500	117.45	172280	7.175	3.37	95.25	.00
18.000	110.57	170171	7.375	3.21	82.00	.00
18.100	109.10	169877	7.425	3.25	81.65	.00
18.200	107.64	169567	7.475	3.29	81.30	.00
18.300	106.19	169241	7.525	3.33	80.95	.00
18.400	104.74	168896	7.575	3.37	80.60	.00
18.500	103.29	168534	7.625	3.41	80.25	.00
18.600	101.85	168190	7.625	3.45	79.90	.00
18.700	100.41	167865	7.675	3.50	79.55	.00
18.800	98.99	167515	7.725	3.55	79.20	.00
18.900	97.57	167140	7.775	3.60	78.85	.00
19.000	96.16	166738	7.825	3.65	78.50	.00
19.100	94.76	166342	7.875	3.71	78.15	.00
19.200	93.38	165959	7.925	3.77	77.80	.00

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PROFILE OF CRESTS AND TIMES FOR EAP TASK1 UPDATE NW
BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE ********	MAX ELEV FEET ********	MAX FLOW CFS ********	TIME MAX ELEV-HRS ********	MAX VEL FPS ********	FLOOD ELEV FEET **********	TIME FLOOD ELEV-HRS **********
19.300	92.00	165545	7.925	3.84	77.45	.00
19.400	90.65	165111	7.975	3.91	77.10	.00
19.500	89.31	164668	8.025	3.98	76.75	.00
19.600	87.98	164255	8.075	4.07	76.40	.00
19.700	86.64	163914	8.075	4.16	76.05	.00
19.800	85.28	163601	8.125	4.28	75.70	.00
19.900	83.82	163333	8.175	4.46	75.35	.00
20.000	82.17	163146	8.175	4.88	75.00	7.18
20.500	74.16	162318	8.325	4.41	66.25	.00
21.000	66.88	161353	8.475	3.98	57.50	.00
21.500	59.77	160438	8.575	3.77	48.75	.00
22.000	53.17	159005	8.775	3.38	40.00	.00
22.500	47.01	157245	8.975	3.26	35.50	.00
23.000	40.96	154898	9.225	3.07	31.00	.00
23.500	34.41	153447	9.425	3.19	26.50	.00
24.000	29.13	149912	9.825	2.55	22.00	.00
24.500	25.28	145228	10.175	2.45	19.67	8.28
25.000	21.54	141074	10.475	3.83	17.33	9.18
25.500	17.66	137073	10.825	5.48	15.00	9.68
26.000	13.89	132810	11.275	2.64	11.25	10.03
26.500	10.71	129585	11.525	1.96	7.50	10.13
27.000	7.77	125498	12.375	1.94	3.75	.00
27.500	6.96	115596	13.375	1.04	.00	.00
28.000	6.64	104637	13.925	.96	.44	.00
28.500	6.36	95690	14.425	.89	.89	.00
29.000	6.09	88431	14.925	.82	1.33	.00
29.500	5.85	82601	15.325	.77	1.78	.00
30.000	5.62	78043	15.725	.72	2.22	.00
30.500	5.40	74654	15.975	.68	2.67	.00
31.000	5.19	72332	16.225	.64	3.11	.00
31.500	4.99	70910	16.425	.62	3.56	.00
32.000	4.79	70129	16.575	.61	4.00	.00
32.633	4.54	69698	16.725	.59	4.00	.00
33.267	4.28	69603	16.825	.58	4.00	.00
33.900	4.00	69610	.025	.58	4.00	.00

Appendix C2.

Fair Weather DAMBRK Output – Southeast Valley

DAMBRK Summary
Fair Weather Failure
Southeast Valley

Input File: SE-Task1.I
Output File: SE-Task1.O

PROFILE OF CRESTS AND TIMES FOR EAP UPDATE SE VALLEY
BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE ********	MAX ELEV FEET ********	MAX FLOW CFS ********	TIME MAX ELEV-HRS ********	MAX VEL FPS ********	FLOOD ELEV FEET **********	TIME FLOOD ELEV-HRS **********
.500	419.39	710000	48.600	121.33	410.00	48.60
.750	416.52	700600	48.000	12.57	403.00	47.40
1.000	408.85	689442	48.000	11.39	396.00	47.40
1.250	401.19	676612	48.000	10.48	389.00	47.40
1.500	393.54	661885	48.000	9.73	382.00	46.80
1.750	385.90	644927	48.000	9.09	375.00	45.60
2.000	378.31	625576	48.000	8.49	368.00	43.20
2.250	370.60	603137	48.000	8.04	361.00	40.80
2.500	363.30	577436	48.600	7.26	354.00	.00
2.750	355.30	589462	48.600	7.54	347.00	.00
3.000	349.65	603838	48.600	5.71	340.00	.00
3.250	345.28	615289	48.600	6.69	334.38	47.40
3.500	340.79	621958	48.600	6.14	328.75	47.40
3.750	336.17	622315	48.600	6.34	323.13	47.40
4.000	331.45	619955	48.600	6.54	317.50	47.40
4.250	326.61	616523	48.600	6.75	311.88	45.60
4.500	321.64	606714	48.600	6.93	306.25	45.60
4.750	316.74	587943	48.900	7.03	300.63	.00
5.000	312.19	589152	48.900	6.98	295.00	.00
5.250	307.85	595186	48.900	6.86	291.50	46.80
5.500	302.94	596360	48.900	7.44	288.00	47.70
5.750	297.56	591978	48.900	7.32	283.25	47.70
6.000	292.26	579701	49.050	7.18	278.50	48.00
6.250	287.04	583159	49.050	7.00	273.75	48.00
6.500	281.79	580109	49.050	6.90	269.00	48.00
6.750	276.56	568563	49.200	6.77	264.25	48.00
7.000	271.44	569946	49.200	6.59	259.50	48.00
7.250	266.25	569455	49.200	6.54	254.75	48.60
7.500	261.43	560457	49.200	6.14	250.00	48.00
7.750	256.98	539205	49.500	5.90	246.00	48.60
8.000	252.79	541734	49.500	5.66	242.00	48.60
8.250	248.53	548883	49.500	5.53	238.00	48.60
8.500	244.19	544629	49.500	5.42	234.00	48.60
8.750	239.74	529059	49.500	5.32	230.00	48.60
9.000	235.48	507625	49.800	5.21	226.00	48.60
9.250	231.29	515858	49.800	5.08	222.00	48.60
9.500	227.04	516348	49.800	4.99	218.00	48.60
9.750	222.70	507621	49.800	4.95	214.00	48.90
10.000	218.99	487468	50.100	4.52	210.00	48.90
10.250	215.71	488799	50.100	4.51	206.38	48.90
10.500	212.38	488005	50.100	4.48	202.75	48.90
10.750	208.98	479518	50.100	4.52	199.13	49.05
11.000	205.75	462928	50.400	4.56	195.50	49.05
11.250	202.64	466727	50.400	4.58	191.88	48.90
11.500	199.57	467522	50.400	4.58	188.25	48.60
11.750	196.52	462189	50.400	4.63	184.63	40.80
12.000	193.60	450505	50.700	4.66	181.00	.00
12.250	190.84	444963	50.700	4.60	177.13	.00

PROFILE OF CRESTS AND TIMES FOR EAP UPDATE SE VALLEY
BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE ********	MAX ELEV FEET ********	MAX FLOW CFS ********	TIME MAX ELEV-HRS ********	MAX VEL FPS ********	FLOOD ELEV FEET **********	TIME FLOOD ELEV-HRS **********
12.500	188.05	447433	50.700	4.51	173.25	.00
12.750	185.21	446478	50.700	4.45	169.38	.00
13.000	182.31	439349	51.000	4.44	165.50	.00
13.250	179.61	426864	51.000	4.39	161.63	.00
13.500	176.88	432178	51.000	4.28	157.75	.00
13.750	174.10	431434	51.000	4.21	153.88	.00
14.000	171.70	418418	51.300	3.99	150.00	.00
14.050	171.28	414057	51.300	4.00	149.71	.00
14.100	170.85	409053	51.300	4.01	149.43	.00
14.150	170.42	407030	51.300	4.03	149.14	.00
14.200	169.98	407954	51.300	4.04	148.86	.00
14.250	169.54	408736	51.300	4.04	148.57	.00
14.300	169.09	409349	51.300	4.05	148.29	.00
14.350	168.64	409752	51.300	4.05	148.00	.00
14.400	168.18	409892	51.300	4.05	147.71	.00
14.450	167.72	409687	51.300	4.05	147.43	.00
14.500	167.24	409027	51.300	4.05	147.14	.00
14.550	166.76	407774	51.300	4.05	146.86	.00
14.600	166.30	405840	51.600	4.06	146.57	.00
14.650	165.87	403237	51.600	4.07	146.29	.00
14.700	165.44	399982	51.600	4.08	146.00	.00
14.750	165.01	396024	51.600	4.11	145.71	.00
14.800	164.57	391298	51.600	4.13	145.43	.00
14.850	164.13	385755	51.600	4.15	145.14	.00
14.900	163.68	384197	51.600	4.16	144.86	.00
14.950	163.23	384832	51.600	4.18	144.57	.00
15.000	162.77	385242	51.600	4.19	144.29	.00
15.050	162.30	385356	51.600	4.20	144.00	.00
15.100	161.82	385080	51.600	4.21	143.71	.00
15.150	161.33	384284	51.600	4.22	143.43	.00
15.200	160.86	382849	51.900	4.24	143.14	.00
15.250	160.42	380710	51.900	4.25	142.86	.00
15.300	159.98	377841	51.900	4.26	142.57	.00
15.350	159.54	374234	51.900	4.27	142.29	.00
15.400	159.09	369893	51.900	4.27	142.00	.00
15.450	158.63	364828	51.900	4.27	141.71	40.80
15.500	158.17	361667	51.900	4.26	141.43	43.20
15.550	157.70	361842	51.900	4.28	141.14	45.60
15.600	157.22	361701	51.900	4.30	140.86	47.40
15.650	156.76	361151	52.050	4.33	140.57	48.00
15.700	156.30	360100	52.050	4.35	140.29	49.50
15.750	155.83	358501	52.050	4.37	140.00	49.80
15.800	155.36	356330	52.125	4.39	139.71	50.10
15.850	154.90	353567	52.162	4.40	139.43	50.10
15.900	154.69	350198	57.375	4.42	139.14	50.40
15.950	154.67	347369	57.412	4.42	138.86	50.40
16.000	154.64	345878	57.450	4.43	138.57	50.40
16.050	154.62	343923	57.487	4.43	138.29	50.70

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PROFILE OF CRESTS AND TIMES FOR EAP UPDATE SE VALLEY
BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE ********	MAX ELEV FEET ********	MAX FLOW CFS ********	TIME MAX ELEV-HRS ********	MAX VEL FPS ********	FLOOD ELEV FEET **********	TIME FLOOD ELEV-HRS **********
16.100	154.61	341427	57.487	4.43	138.00	50.70
16.150	154.59	339328	57.525	4.42	137.71	50.70
16.200	154.58	337125	57.525	4.45	137.43	50.70
16.250	154.57	335116	57.525	4.47	137.14	50.70
16.300	154.56	333079	57.562	4.50	136.86	50.70
16.350	154.55	331077	57.562	4.52	136.57	50.70
16.400	154.55	329099	57.562	4.54	136.29	51.00
16.450	154.54	327106	57.562	4.55	136.00	51.00
16.500	154.53	325101	57.562	4.56	135.71	51.00
16.550	154.53	323032	57.562	4.57	135.43	51.00
16.600	154.52	320884	57.600	4.57	135.14	51.00
16.650	154.52	318659	57.600	4.58	134.86	51.00
16.700	154.51	316287	57.600	4.60	134.57	51.00
16.750	154.51	313565	57.600	4.61	134.29	51.00
16.800	154.51	310615	57.600	4.62	134.00	51.30
16.850	154.50	307115	57.600	4.61	133.71	51.30
16.900	154.50	302991	57.600	4.60	133.43	51.30
16.950	154.50	298155	57.600	4.59	133.14	51.30
17.000	154.49	292506	57.600	4.57	132.86	51.30
17.050	154.49	285935	57.600	4.52	132.57	51.30
17.100	154.49	278330	57.600	4.45	132.29	51.30
17.150	154.49	269583	57.600	4.36	132.00	51.30
17.200	154.49	259599	57.600	4.23	131.71	51.30
17.250	154.48	248482	57.600	4.06	131.43	51.30
17.300	154.48	236340	57.600	3.85	131.14	51.60
17.350	154.48	222956	57.600	3.59	130.86	51.60
17.400	154.48	208610	57.600	3.31	130.57	51.60
17.450	154.48	193644	57.600	2.99	130.29	51.60
17.500	154.48	178172	57.600	2.66	130.00	51.60
17.550	154.48	162794	57.600	2.49	130.00	51.60
17.600	154.47	148232	57.600	2.32	130.00	51.60
17.650	154.47	134560	57.600	2.16	130.00	51.60
17.700	154.47	121848	57.600	2.01	130.00	51.60
17.750	154.47	110228	57.600	1.88	130.00	51.60
17.800	154.46	99991	57.600	1.76	130.00	51.60
17.850	154.46	91644	57.600	1.66	130.00	51.60
17.900	154.45	90820	57.600	1.58	130.00	51.60
17.950	154.45	90183	57.600	1.52	130.00	51.60
18.000	154.44	89723	57.600	1.49	130.00	51.60
18.050	154.43	89388	57.600	1.50	130.00	51.60
18.100	154.41	89139	57.600	1.58	130.00	51.60
18.150	154.38	88960	57.600	1.79	130.00	51.60
18.200	154.31	88836	57.637	2.25	130.00	51.60
18.250	154.14	88758	57.637	3.33	130.00	51.60
18.300	153.18	88719	57.712	7.36	130.00	51.60
18.550	152.43	88606	57.750	7.11	132.50	52.05
18.800	151.73	88473	57.787	6.91	135.00	52.42
19.050	151.06	88323	57.825	6.70	137.50	52.84

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PROFILE OF CRESTS AND TIMES FOR EAP UPDATE SE VALLEY

BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE ********	MAX ELEV FEET ********	MAX FLOW CFS ********	TIME MAX ELEV-HRS ********	MAX VEL FPS ********	FLOOD ELEV FEET **********	TIME FLOOD ELEV-HRS **********
19.300	150.43	88166	57.862	6.51	140.00	53.29
19.650	149.72	87982	57.862	6.36	135.00	52.95
20.000	149.23	87874	57.900	6.14	130.00	52.72
20.050	149.14	87865	57.900	6.29	135.00	53.14
20.100	149.03	87858	57.900	6.44	140.00	53.77
20.150	148.91	87852	57.900	6.60	145.00	54.90
20.200	148.76	87848	57.900	6.75	150.00	.00
20.250	148.88	87845	57.900	7.50	145.00	54.94
20.300	148.77	87842	57.900	7.54	140.00	53.96

Appendix C3.

HEC-RAS Output – Pajaro River Appendix

HEC-RAS Summary Outp
Fair Weather Scenario
Pajaro River

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X     X
X     X  X        X           X   X     X    X    X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X                    X  X     X    X        X
X     X  X        X    X       X   X   X    X   X        X
X     X  XXXXXX    XXXX        X    X  X    X   XXXXX
```

PROJECT DATA
Project Title: Anderson Dam EAP Update
Project File : pajaro.prj
Run Date and Time: 1/25/03 1:29:36 PM

Project in English units

Project Description:
PAJARO RIVER

PLAN DATA

Plan Title: Anderson Dam "Fair Weather" Breach
Plan File : c:\19420-00-02001 Inundation\UPDATE\HECRAS\FINAL\pajaro.p01

Geometry Title: Pajaro - mouth to San Benito
Geometry File : c:\19420-00-02001 Inundation\UPDATE\HECRAS\FINAL\pajaro.g03

Flow Title :
Flow File :

Plan Summary Information:

Number of:	Cross Sections	= 123	Mulitple Openings	=	0
	Culverts	= 0	Inline Weirs	=	0
	Bridges	= 5			

Computational Information

Water surface calculation tolerance	= 0.003
Critical depth calculaton tolerance	= 0.003
Maximum number of interations	= 20
Maximum difference tolerance	= 0.1
Flow tolerance factor	= 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title:
Flow File :

Flow Data (cfs)

River	Reach	RS	PF 1

Boundary Conditions

River	Reach	Profile	Upstream	Downstream

Profile Output Table - HEC-5Q

River	Reach	River Sta	W.S. Elev (ft)	Area (sq ft)	Hydr Rad 2/3 (ft)	Top Width (ft)	Mann Wtd Total	Q Total (cfs)
SAN BENITO	REACH-1	1667	138.37	16670.0	6.11	1098.7	0.040	993.9
SAN BENITO	REACH-1	2467	138.37	13222.2	3.79	1779.9	0.060	995.7
SAN BENITO	REACH-1	6067	138.38	9037.5	5.35	718.8	0.041	1000.0
PAJARO RIVER	DS ELK	0	14.05	15914.7	3.47	2462.7	0.041	68784.7
PAJARO RIVER	DS ELK	1500	15.33	19129.5	3.84	2546.5	0.041	68795.9
PAJARO RIVER	DS ELK	2550	15.89	46523.4	4.73	4518.3	0.044	68808.1
PAJARO RIVER	DS ELK	3910	16.00	46450.3	4.45	4949.5	0.044	68824.3
PAJARO RIVER	DS ELK	4854	16.08	43015.6	4.56	4405.9	0.044	68834.1
PAJARO RIVER	DS ELK	5798	16.16	43201.9	4.57	4406.6	0.044	68842.1
PAJARO RIVER	DS ELK	7121	16.28	51492.5	4.44	5489.1	0.044	68855.0
PAJARO RIVER	DS ELK	8443	16.38	54676.6	3.93	7005.2	0.044	68867.4
PAJARO RIVER	DS ELK	9803	16.51	57943.0	3.98	7277.6	0.044	68880.7
PAJARO RIVER	DS ELK	11049	16.61	63582.3	3.97	8039.0	0.045	68886.9
PAJARO RIVER	DS ELK	12220	16.69	63415.5	3.82	8481.1	0.044	69152.0
PAJARO RIVER	DS ELK	13562	16.80	60249.7	3.57	8914.0	0.045	69198.7
PAJARO RIVER	DS ELK	13600	16.81	60281.9	3.57	8914.1	0.045	69199.9
PAJARO RIVER	DS ELK	13638	16.82	60404.1	3.57	8914.6	0.045	69199.9
PAJARO RIVER	DS ELK	13677	16.82	60436.1	3.58	8914.8	0.045	69201.0
PAJARO RIVER	DS ELK	14984	16.94	64970.7	3.60	9485.2	0.044	69231.3
PAJARO RIVER	DS ELK	16154	17.02	58646.4	3.39	9385.0	0.045	69243.5
PAJARO RIVER	DS ELK	17324	17.10	62619.9	3.51	9519.9	0.045	69678.4
PAJARO RIVER	DS ELK	18454	17.19	61101.7	3.30	10202.4	0.045	69709.8
PAJARO RIVER	DS ELK	19741	17.30	52868.7	2.97	10309.2	0.045	69729.8
PAJARO RIVER	DS ELK	20555	17.96	21336.5	1.93	7927.8	0.044	70715.2
PAJARO RIVER	DS ELK	20750	18.35	17465.2	1.65	8250.0	0.044	71606.9
PAJARO RIVER	DS ELK	20955	25.92	93253.7	4.28	10502.0	0.045	73698.2
PAJARO RIVER	DS ELK	21150	25.93	95877.5	4.33	10623.1	0.045	73705.7
PAJARO RIVER	DS ELK	22104	25.95	89130.1	4.10	10717.0	0.045	73736.9
PAJARO RIVER	DS ELK	23237	25.98	89652.7	3.98	11247.3	0.045	73767.7
PAJARO RIVER	DS ELK	24408	26.02	90325.1	3.85	11944.2	0.045	73805.7
PAJARO RIVER	DS ELK	25501	26.07	82057.5	3.54	12304.6	0.045	73841.9
PAJARO RIVER	DS ELK	27063	26.18	62044.8	3.21	10798.3	0.045	73871.5
PAJARO RIVER	DS ELK	28586	26.39	45864.7	2.50	11574.2	0.044	74480.8
PAJARO RIVER	DS ELK	29952	26.86	39084.8	2.52	9766.1	0.044	75183.4
PAJARO RIVER	DS ELK	29991	26.86	34651.8	2.49	8795.6	0.044	75184.3
PAJARO RIVER	DS ELK	30001	26.87	34685.7	2.50	8788.9	0.044	75184.5
PAJARO RIVER	DS ELK	30033	26.95	35392.2	2.51	8883.0	0.067	75184.5
PAJARO RIVER	DS ELK	30086	27.01	35942.2	2.43	9480.5	0.067	75851.3
PAJARO RIVER	DS ELK	31208	28.14	36945.7	2.39	9993.2	0.067	78836.8
PAJARO RIVER	DS ELK	31250	28.20	41663.7	2.57	10107.1	0.067	78837.0
PAJARO RIVER	DS ELK	31360	28.31	42766.0	2.60	10218.8	0.067	79329.3
PAJARO RIVER	DS ELK	31400	28.36	44699.6	2.63	10464.3	0.068	79329.5
PAJARO RIVER	Lower	32522	28.36	27678.3	2.30	7930.0	0.065	86611.2
PAJARO RIVER	Lower	34676	31.37	47255.0	3.05	8861.5	0.070	88199.7
PAJARO RIVER	Lower	35325	31.97	44293.1	3.14	7946.2	0.070	88219.8
PAJARO RIVER	Lower	36342	32.62	35453.8	3.01	6791.8	0.044	88246.4
PAJARO RIVER	Lower	37798	33.49	30200.9	2.75	6628.0	0.044	88274.1
PAJARO RIVER	Lower	38656	34.58	23117.9	2.24	6901.3	0.043	88286.8
PAJARO RIVER	Lower	39534	36.03	28758.1	2.40	7713.0	0.044	88331.3
PAJARO RIVER	Lower	40452	36.91	34220.6	2.85	7110.3	0.044	88346.2
PAJARO RIVER	Lower	41848	37.77	32056.7	2.63	7519.1	0.044	88358.6
PAJARO RIVER	Lower	43184	39.07	25483.7	2.23	7668.0	0.044	88401.3
PAJARO RIVER	Lower	44461	41.09	20273.9	2.07	6818.6	0.043	88416.1
PAJARO RIVER	Lower	46217	43.26	17540.0	2.46	4539.3	0.043	88418.6
PAJARO RIVER	Lower	47613	45.29	35112.8	2.78	7555.6	0.044	88419.4
PAJARO RIVER	Lower	48461	45.83	36290.3	2.71	8125.7	0.044	88450.6

River	Reach	River Sta	W.S. Elev (ft)	Area (sq ft)	Hydr Rad 2/3 (ft)	Top Width (ft)	Mann Wtd Total	Q Total (cfs)
PAJARO RIVER	Lower	49658	46.76	23074.8	2.67	5294.4	0.043	88470.5
PAJARO RIVER	Lower	50675	47.85	22934.4	3.12	4149.1	0.044	88477.9
PAJARO RIVER	Lower	52072	49.52	18601.6	2.70	4177.6	0.043	88481.9
PAJARO RIVER	Lower	53019	50.63	17771.0	2.83	3732.7	0.043	88501.3
PAJARO RIVER	Lower	54156	51.70	17742.9	3.07	3285.8	0.043	88505.7
PAJARO RIVER	Lower	55273	52.72	21133.8	3.57	3120.2	0.043	88510.4
PAJARO RIVER	Lower	56670	54.11	20911.7	3.41	3322.9	0.044	88519.7
PAJARO RIVER	Lower	57707	55.46	19824.3	3.17	3503.7	0.044	88526.3
PAJARO RIVER	Lower	59303	57.71	18248.8	2.95	3586.3	0.043	88531.3
PAJARO RIVER	Lower	60649	59.74	13696.2	3.55	2040.9	0.042	88556.0
PAJARO RIVER	Lower	60799	60.10	14434.4	3.63	2082.3	0.042	88557.1
PAJARO RIVER	Lower	60800	59.74	11761.9	3.17	2077.2	0.042	88557.1
PAJARO RIVER	Lower	60838	59.93	12145.9	3.20	2114.7	0.042	88557.3
PAJARO RIVER	Lower	60839	59.86	11853.2	3.19	2078.9	0.042	88557.3
PAJARO RIVER	Lower	60890	60.08	12332.7	3.22	2131.8	0.042	88557.7
PAJARO RIVER	Lower	62326	63.31	18410.8	4.26	2088.3	0.043	88566.5
PAJARO RIVER	Lower	63621	64.64	13449.0	4.01	1671.9	0.043	88570.8
PAJARO RIVER	Lower	64835	66.54	11192.6	4.53	1153.6	0.042	88573.6
PAJARO RIVER	Lower	66210	68.75	7698.3	4.19	891.5	0.042	88575.3
PAJARO RIVER	Lower	67363	72.87	10778.1	4.43	1149.4	0.042	88575.9
PAJARO RIVER	Lower	68365	73.89	7572.0	4.13	893.9	0.042	88576.1
PAJARO RIVER	Lower	69346	77.21	8256.8	4.73	795.9	0.042	88594.8
PAJARO RIVER	Lower	70175	79.23	9116.1	5.55	957.5	0.041	88599.1
PAJARO RIVER	Lower	71177	81.45	11678.9	7.30	930.0	0.041	88604.3
PAJARO RIVER	Lower	72219	81.39	6272.5	7.13	318.5	0.040	88607.8
PAJARO RIVER	Lower	73048	84.31	9904.7	5.28	812.2	0.041	88610.5
PAJARO RIVER	Lower	74009	85.87	12344.3	6.24	780.3	0.042	88615.5
PAJARO RIVER	Lower	75466	87.20	16354.3	5.81	1154.4	0.043	88622.2
PAJARO RIVER	Lower	76599	87.86	15802.2	6.21	1009.0	0.044	88627.1
PAJARO RIVER	Lower	77681	87.89	8751.5	7.06	455.0	0.041	88630.2
PAJARO RIVER	Lower	79488	90.49	12697.9	4.48	1331.8	0.041	88633.4
PAJARO RIVER	Lower	79539	90.83	14535.6	4.55	1483.0	0.041	88633.5
PAJARO RIVER	Lower	79564	91.15	15006.5	4.61	1500.2	0.041	88672.8
PAJARO RIVER	Lower	79615	91.25	17185.4	4.95	1552.5	0.044	88673.4
PAJARO RIVER	Lower	80964	92.26	22073.2	5.40	1747.7	0.045	88691.1
PAJARO RIVER	Lower	82335	92.90	9546.6	5.25	781.1	0.043	88702.3
PAJARO RIVER	Lower	83788	95.30	8433.4	7.03	442.1	0.040	88705.9
PAJARO RIVER	Lower	84811	95.44	5758.2	5.72	407.3	0.040	88706.5
PAJARO RIVER	Lower	87705	103.75	8831.1	9.09	296.3	0.040	88751.6
PAJARO RIVER	Lower	90339	106.08	10597.7	9.25	355.3	0.040	88753.2
PAJARO RIVER	Lower	93817	108.16	19140.3	7.74	884.8	0.040	88755.6
PAJARO RIVER	Lower	95864	108.61	18494.0	9.01	670.8	0.040	88756.8
PAJARO RIVER	Lower	98012	109.11	14189.2	7.63	664.6	0.040	88828.6
PAJARO RIVER	Lower	99445	109.72	13353.2	8.12	563.3	0.040	88839.4
PAJARO RIVER	Lower	100000	106.77	3422.2	5.14	288.8	0.040	88756.4
PAJARO RIVER	Lower	102000	132.58	14531.3	8.68	556.5	0.040	71648.0
PAJARO RIVER	Lower	104000	133.00	11228.9	8.29	453.6	0.040	71704.7
PAJARO RIVER	Lower	106000	133.69	6310.7	7.95	263.5	0.040	71804.5
PAJARO RIVER	Lower	108000	137.47	13347.5	7.65	623.8	0.040	81924.0
PAJARO RIVER	Lower	110000	138.37	16956.8	9.48	566.4	0.040	85474.2
PAJARO RIVER	Upper	111586	138.37	9885.4	9.13	302.4	0.040	84480.4
PAJARO RIVER	Upper	112793	139.10	9513.1	8.94	302.6	0.040	84486.3
PAJARO RIVER	Upper	114000	139.97	9181.0	8.77	303.0	0.040	87833.0
ELKHORN	SLOUGH	0	4.60	13796.5	2.76	2999.5	0.035	991.3
ELKHORN	SLOUGH	3450	4.73	9346.3	2.13	2991.2	0.035	6527.7
ELKHORN	SLOUGH	7200	5.31	6008.3	1.59	2990.8	0.035	6529.1
ELKHORN	SLOUGH	11000	7.66	3119.6	1.54	1636.2	0.035	6537.9
ELKHORN	SLOUGH	14550	9.94	6047.8	1.54	3152.7	0.035	6545.2
ELKHORN	SLOUGH	19000	11.29	4856.9	1.63	2330.2	0.035	6581.4
ELKHORN	SLOUGH	21500	11.91	9158.8	1.54	4797.0	0.035	6597.5
ELKHORN	SLOUGH	26500	16.99	1574.6	2.23	471.1	0.035	6707.8
ELKHORN	SLOUGH	30150	21.78	2376.7	2.79	510.8	0.035	6711.3
ELKHORN	SLOUGH	33250	22.87	5429.6	3.19	953.5	0.035	6713.2
ELKHORN	SLOUGH	36400	23.05	11347.0	3.30	1892.8	0.035	6715.3
ELKHORN	SLOUGH	39000	23.09	16848.2	2.87	3459.3	0.035	6767.5
ELKHORN	SLOUGH	40750	24.40	2367.1	2.98	460.0	0.060	7032.1
ELKHORN	SLOUGH	43050	28.36	1340.9	3.86	170.9	0.045	7281.7

APPENDIX D

Routing Results for IDF Scenario

D1. IDF DAMBRK Output – Northwest Valley

D2. IDF DAMBRK Output – Southwest Valley

D3. IDF HEC-RAS OUTPUT – Pajaro River

Appendix D1.

IDF DAMBRK Output – Northwest Valley

DAMBRK Summary Output
IDF Scenario
Northwest Valley

Input File: NW-PMF.I
Output File: NW-PMF.O

PROFILE OF CRESTS AND TIMES FOR EAP UPDATE NW VALLEY
BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE	MAX ELEV FEET	MAX FLOW CFS	TIME MAX ELEV-HRS	MAX VEL FPS	FLOOD ELEV FEET	TIME FLOOD ELEV-HRS
.500	428.09	746884	48.000	16.14	410.00	45.30
1.000	406.90	728349	48.000	14.44	395.00	46.90
1.500	394.63	725342	48.100	8.55	380.00	.00
2.000	375.96	718169	48.100	12.11	370.00	47.40
2.500	356.64	710531	48.200	8.63	340.00	47.40
3.000	344.64	696640	48.300	8.55	326.67	41.70
3.500	332.59	693206	48.300	8.90	313.33	33.10
4.000	322.60	679674	48.400	7.48	300.00	.00
4.500	313.52	663930	48.500	7.87	290.83	29.20
5.000	303.73	654786	48.600	8.40	281.67	.00
5.500	293.58	645863	48.600	8.80	272.50	.00
6.000	283.27	642079	48.700	9.03	263.33	.00
6.500	277.47	619773	49.200	8.88	254.17	.00
7.000	276.47	550024	49.200	5.25	245.00	.00
7.500	275.49	496328	49.200	5.67	243.33	.00
8.000	273.73	478490	49.300	6.37	241.67	.00
8.500	268.93	474044	49.400	11.24	240.00	32.70
9.000	262.19	462948	49.500	11.60	230.71	32.30
9.500	255.47	451221	49.600	12.08	221.43	31.50
10.000	247.34	437163	49.700	12.63	212.14	31.40
10.500	236.61	428656	49.800	12.07	202.86	.00
11.000	224.96	419806	50.000	8.22	193.57	30.40
11.500	209.86	417139	50.000	8.85	184.29	.00
12.000	199.30	406081	50.400	5.94	175.00	.00
12.500	192.65	389785	50.600	5.83	170.00	.00
13.000	184.55	380518	50.700	6.92	165.00	.00
13.500	175.57	368628	51.000	9.66	161.00	.00
14.000	171.09	361461	51.400	4.57	155.00	40.30
14.500	167.90	341290	51.600	10.26	150.00	42.36
15.000	166.20	328022	51.700	8.19	150.00	50.10
15.500	160.06	327991	51.600	21.06	150.00	50.90
16.000	143.62	325542	52.000	5.67	135.00	45.40
16.500	135.62	402155	52.100	5.53	121.75	.00
17.000	127.84	399316	52.300	4.87	108.50	.00
17.500	120.53	397451	52.500	4.37	95.25	.00
18.000	113.47	395347	52.600	3.99	82.00	.00
18.100	112.07	394902	52.700	4.02	81.65	.00
18.200	110.68	394267	52.700	4.06	81.30	.00
18.300	109.30	394029	52.700	4.09	80.95	.00
18.400	107.93	393550	52.800	4.13	80.60	.00
18.500	106.57	392892	52.800	4.16	80.25	.00
18.600	105.22	392598	52.900	4.20	79.90	.00
18.700	103.89	392045	52.900	4.24	79.55	.00
18.800	102.58	391269	52.900	4.27	79.20	.00
18.900	101.29	390809	53.000	4.31	78.85	.00
19.000	100.03	390034	53.000	4.35	78.50	.00
19.100	98.82	389132	53.100	4.38	78.15	.00
19.200	97.64	388404	53.100	4.42	77.80	.00

PROFILE OF CRESTS AND TIMES FOR EAP UPDATE NW VALLEY
BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE ********	MAX ELEV FEET ********	MAX FLOW CFS ********	TIME MAX ELEV-HRS ********	MAX VEL FPS ********	FLOOD_ELEV FEET **********	TIME FLOOD ELEV-HRS **********
19.300	96.49	387349	53.200	4.45	77.45	.00
19.400	95.37	386632	53.200	4.49	77.10	.00
19.500	94.26	385767	53.200	4.54	76.75	.00
19.600	93.13	384978	53.300	4.59	76.40	.00
19.700	91.97	384388	53.300	4.68	76.05	.00
19.800	90.73	383585	53.300	4.81	75.70	.00
19.900	89.33	383283	53.300	5.05	75.35	.00
20.000	87.59	382838	53.400	5.55	75.00	.00
20.500	78.57	381645	53.500	5.50	66.25	.00
21.000	70.81	380761	53.600	5.15	57.50	.00
21.500	63.35	379848	53.700	4.90	48.75	.00
22.000	56.59	378840	53.800	4.41	40.00	.00
22.500	50.24	377540	54.000	4.19	35.50	.00
23.000	44.04	376339	54.100	3.91	31.00	.00
23.500	37.34	375322	54.200	4.00	26.50	.00
24.000	32.14	372912	54.500	3.13	22.00	.00
24.500	28.24	369851	54.700	2.98	19.67	.00
25.000	24.46	366873	54.900	2.82	17.33	32.40
25.500	20.65	363626	55.100	2.75	15.00	46.90
26.000	16.96	359640	55.300	2.73	12.25	48.90
26.500	13.68	354449	55.700	2.66	9.50	49.70
27.000	11.71	342064	56.900	2.32	6.75	49.40
27.500	11.07 *	322930	57.500	1.56	4.00	.00
28.000	10.68	304173	57.800	1.51	4.00	.00
28.500	10.30	288338	58.200	1.46	4.00	.00
29.000	9.92	274875	58.500	1.42	4.00	.00
29.500	9.55	263314	58.800	1.38	4.00	.00
30.000	9.16	253678	59.100	1.35	4.00	.00
30.500	8.77	245938	59.300	1.33	4.00	.00
31.000	8.35	240218	59.500	1.31	4.00	.00
31.500	7.91	236443	59.700	1.30	4.00	.00
32.000	7.42	234172	59.800	1.32	4.00	.00
32.633	6.72	232606	60.000	1.33	4.00	.00
33.267	5.82	232039	60.100	1.42	4.00	.00
33.900	4.00	232021	.000	1.93	4.00	.00

Appendix D2.

IDF DAMBRK Output – Southwest Valley

DAMBRK Summary Output
IDF Scenario
Southeast Valley

Input File: SE-PMF.I
Output File: SE-PMF.O

PROFILE OF CRESTS AND TIMES FOR EAP UPDATE SE VALLEY
BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE ********	MAX ELEV FEET ********	MAX FLOW CFS ********	TIME MAX ELEV-HRS ********	MAX VEL FPS ********	FLOOD ELEV FEET **********	TIME FLOOD ELEV-HRS **********
.500	426.45	882653	47.991	15.73	410.00	47.09
.750	418.74	876774	48.030	13.85	403.00	47.07
1.000	410.98	875107	48.030	12.59	396.00	47.03
1.250	403.26	868011	48.068	11.59	389.00	44.49
1.500	395.59	867004	48.068	10.81	382.00	36.00
1.750	387.96	861419	48.107	10.15	375.00	36.00
2.000	380.37	858924	48.107	9.56	368.00	31.20
2.250	372.75	855308	48.145	9.08	361.00	.00
2.500	365.34	850750	48.184	8.46	354.00	.00
2.750	357.09	848495	48.222	8.62	347.00	.00
3.000	351.46	842679	48.261	6.53	340.00	.00
3.250	347.01	835500	48.299	8.33	334.38	37.20
3.500	342.51	828951	48.337	6.85	328.75	38.17
3.750	337.93	823024	48.376	7.02	323.13	37.94
4.000	333.27	817431	48.414	7.21	317.50	37.20
4.250	328.52	812199	48.453	7.41	311.88	33.60
4.500	323.73	807453	48.491	7.60	306.25	28.80
4.750	318.93	802854	48.530	7.75	300.63	.00
5.000	314.28	797923	48.568	7.79	295.00	.00
5.250	309.82	792416	48.607	7.75	291.50	36.00
5.500	304.79	786933	48.645	8.34	288.00	42.30
5.750	299.41	781670	48.684	8.17	283.25	42.19
6.000	294.08	776590	48.722	8.01	278.50	41.85
6.250	288.78	771695	48.761	7.85	273.75	41.39
6.500	283.51	766985	48.799	7.71	269.00	40.81
6.750	278.27	762471	48.838	7.57	264.25	40.58
7.000	273.06	758387	48.876	7.44	259.50	39.32
7.250	267.87	754054	48.914	7.32	254.75	39.20
7.500	263.13	749630	48.991	6.90	250.00	38.17
7.750	258.70	744885	49.030	6.67	246.00	38.51
8.000	254.31	739262	49.068	6.47	242.00	38.86
8.250	249.96	732811	49.107	6.28	238.00	39.20
8.500	245.63	726483	49.184	6.10	234.00	39.43
8.750	241.32	720000	49.222	5.95	230.00	39.66
9.000	237.03	712092	49.299	5.80	226.00	39.89
9.250	232.76	704382	49.338	5.68	222.00	40.12
9.500	228.50	695401	49.415	5.56	218.00	40.24
9.750	224.23	685433	49.491	5.51	214.00	41.62
10.000	220.47	674157	49.568	5.07	210.00	40.24
10.250	217.06	662440	49.607	5.05	206.38	40.24
10.500	213.70	651121	49.684	5.06	202.75	40.12
10.750	210.40	640447	49.761	5.11	199.13	39.55
11.000	207.18	630493	49.838	5.15	195.50	38.86
11.250	204.03	620570	49.915	5.18	191.88	37.94
11.500	200.98	610448	49.992	5.20	188.25	36.00
11.750	198.02	600701	50.068	5.21	184.63	.00
12.000	195.10	592153	50.107	5.20	181.00	.00
12.250	192.21	584476	50.184	5.12	177.13	.00

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PROFILE OF CRESTS AND TIMES FOR EAP UPDATE SE VALLEY
BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE ********	MAX ELEV FEET ********	MAX FLOW CFS ********	TIME MAX ELEV-HRS ********	MAX VEL FPS ********	FLOOD ELEV FEET **********	TIME FLOOD ELEV-HRS **********
12.500	189.34	577133	50.261	5.05	173.25	.00
12.750	186.49	570037	50.338	4.97	169.38	.00
13.000	183.64	563143	50.415	4.90	165.50	.00
13.250	180.81	556630	50.453	4.83	161.63	.00
13.500	178.00	550244	50.530	4.77	157.75	.00
13.750	175.29	542423	50.645	4.70	153.88	.00
14.000	172.91	533040	50.722	4.43	150.00	.00
14.050	172.47	530897	50.761	4.44	149.71	.00
14.100	172.03	529128	50.761	4.45	149.43	.00
14.150	171.58	527054	50.799	4.47	149.14	.00
14.200	171.14	525123	50.799	4.48	148.86	.00
14.250	170.70	523096	50.838	4.49	148.57	.00
14.300	170.25	521038	50.838	4.51	148.29	.00
14.350	169.81	519040	50.876	4.52	148.00	.00
14.400	169.37	516885	50.876	4.53	147.71	.00
14.450	168.92	514899	50.915	4.54	147.43	.00
14.500	168.48	512671	50.915	4.55	147.14	.00
14.550	168.03	510681	50.953	4.57	146.86	.00
14.600	167.58	508403	50.953	4.57	146.57	.00
14.650	167.14	506392	50.992	4.59	146.29	.00
14.700	166.69	504080	50.992	4.60	146.00	.00
14.750	166.24	502035	51.030	4.61	145.71	.00
14.800	165.79	499706	51.069	4.62	145.43	.00
14.850	165.35	497609	51.069	4.64	145.14	.00
14.900	164.90	495275	51.107	4.65	144.86	.00
14.950	164.45	493111	51.107	4.66	144.57	.00
15.000	164.00	490788	51.146	4.67	144.29	.00
15.050	163.54	488539	51.184	4.69	144.00	.00
15.100	163.10	486239	51.184	4.70	143.71	.00
15.150	162.64	483887	51.222	4.72	143.43	.00
15.200	162.19	481621	51.222	4.73	143.14	.00
15.250	161.74	479146	51.261	4.74	142.86	.00
15.300	161.28	476925	51.299	4.76	142.57	.00
15.350	160.83	474479	51.299	4.77	142.29	.00
15.400	160.38	472138	51.338	4.79	142.00	.00
15.450	159.92	469757	51.376	4.80	141.71	.00
15.500	159.47	467255	51.376	4.81	141.43	.00
15.550	159.01	464937	51.415	4.82	141.14	.00
15.600	158.84	462451	57.070	4.84	140.86	.00
15.650	158.82	460012	57.108	4.85	140.57	.00
15.700	158.81	457602	57.108	4.86	140.29	33.60
15.750	158.79	455053	57.146	4.87	140.00	36.00
15.800	158.78	452632	57.146	4.88	139.71	36.00
15.850	158.77	450171	57.146	4.89	139.43	37.20
15.900	158.76	447592	57.185	4.90	139.14	37.48
15.950	158.75	445145	57.185	4.92	138.86	38.17
16.000	158.74	442658	57.185	4.92	138.57	38.51
16.050	158.73	440074	57.185	4.93	138.29	38.97

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PROFILE OF CRESTS AND TIMES FOR EAP UPDATE SE VALLEY
BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE ********	MAX ELEV FEET ********	MAX FLOW CFS ********	TIME MAX ELEV-HRS ********	MAX VEL FPS ********	FLOOD ELEV FEET **********	TIME FLOOD ELEV-HRS **********
16.100	158.73	437562	57.223	4.94	138.00	39.55
16.150	158.72	435062	57.223	4.95	137.71	39.89
16.200	158.72	432478	57.223	4.96	137.43	40.24
16.250	158.71	429854	57.223	4.96	137.14	40.47
16.300	158.71	427342	57.223	4.96	136.86	40.93
16.350	158.70	424736	57.223	4.97	136.57	41.27
16.400	158.70	422032	57.223	4.97	136.29	41.62
16.450	158.70	419352	57.223	4.97	136.00	41.85
16.500	158.69	416603	57.223	4.96	135.71	42.30
16.550	158.69	413618	57.223	4.96	135.43	42.65
16.600	158.69	410523	57.223	4.95	135.14	42.99
16.650	158.68	406987	57.223	4.93	134.86	43.22
16.700	158.68	403109	57.262	4.91	134.57	43.57
16.750	158.68	398508	57.262	4.88	134.29	43.72
16.800	158.68	393086	57.262	4.84	134.00	43.84
16.850	158.68	386805	57.262	4.80	133.71	43.88
16.900	158.67	379540	57.262	4.73	133.43	43.88
16.950	158.67	371087	57.262	4.65	133.14	43.80
17.000	158.67	361367	57.262	4.54	132.86	43.66
17.050	158.67	350351	57.262	4.41	132.57	43.57
17.100	158.67	338063	57.262	4.24	132.29	43.45
17.150	158.67	324566	57.262	4.05	132.00	43.22
17.200	158.67	309952	57.262	3.82	131.71	43.11
17.250	158.66	294353	57.262	3.56	131.43	42.88
17.300	158.66	277925	57.262	3.28	131.14	42.65
17.350	158.66	260812	57.262	2.99	130.86	42.42
17.400	158.66	243153	57.262	2.70	130.57	42.19
17.450	158.66	225067	57.262	2.41	130.29	41.96
17.500	158.66	206661	57.262	2.13	130.00	41.62
17.550	158.66	188589	57.262	1.99	130.00	41.73
17.600	158.66	171483	57.262	1.87	130.00	41.73
17.650	158.66	155540	57.262	1.75	130.00	41.73
17.700	158.65	140780	57.262	1.65	130.00	41.73
17.750	158.65	127132	57.262	1.55	130.00	41.85
17.800	158.65	114886	57.262	1.47	130.00	41.85
17.850	158.65	104075	57.262	1.40	130.00	41.85
17.900	158.64	102740	57.262	1.35	130.00	41.85
17.950	158.64	102654	57.262	1.32	130.00	41.85
18.000	158.63	102596	57.262	1.32	130.00	41.85
18.050	158.62	102554	57.262	1.36	130.00	41.96
18.100	158.60	102527	57.262	1.45	130.00	41.96
18.150	158.58	102510	57.262	1.65	130.00	41.96
18.200	158.52	102499	57.262	2.07	130.00	42.08
18.250	158.37	102493	57.262	3.02	130.00	42.19
18.300	157.48	102491	57.262	6.54	130.00	42.76
18.550	156.96	102482	57.300	5.97	132.50	46.76
18.800	156.50	102474	57.300	5.44	135.00	50.68
19.050	156.09	102466	57.339	4.92	137.50	51.65

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PROFILE OF CRESTS AND TIMES FOR EAP UPDATE SE VALLEY

BELOW LEROY ANDERSON DAM

DISTANCE FROM DAM MILE ********	MAX ELEV FEET ********	MAX FLOW CFS ********	TIME MAX ELEV-HRS ********	MAX VEL FPS ********	FLOOD ELEV FEET **********	TIME FLOOD ELEV-HRS **********
19.300	155.74	102459	57.339	4.41	140.00	51.95
19.650	155.33	102451	57.339	3.75	135.00	51.45
20.000	155.02	102447	57.339	3.44	130.00	47.57
20.050	154.96	102447	57.339	3.63	135.00	51.53
20.100	154.88	102447	57.377	3.83	140.00	52.03
20.150	154.80	102446	57.377	4.06	145.00	52.45
20.200	154.70	102446	57.377	4.32	150.00	53.18
20.250	154.81	102446	57.377	3.35	145.00	52.45
20.300	154.79	102446	57.377	3.76	140.00	52.07

Appendix D3.

IDF HEC-RAS OUTPUT – Pajaro River

HEC-RAS Summary Output
IDF Scenario
Pajaro River

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                HEC-RAS Version 3.0.1  Mar 2001
                U.S. Army Corp of Engineers
                Hydrologic Engineering Center
                  609 Second Street, Suite D
                  Davis, California 95616-4687
                       (916) 756-1104

     X     X  XXXXXX    XXXX        XXXX       XX      XXXX
     X     X  X       X    X      X   X     X  X    X
     X     X  X            X           X   X    X    X
     XXXXXXX  XXXX        X      XXX  XXXX     XXXXXX    XXXX
     X     X  X            X           X  X     X    X        X
     X     X  X          X    X        X   X    X    X        X
     X     X  XXXXXX     XXXX          X    X   X    X    XXXXX
```

PROJECT DATA
Project Title: Anderson Dam EAP Update
Project File : pajaro.prj
Run Date and Time: 1/27/03 7:06:22 AM

Project in English units

Project Description:
PAJARO RIVER

PLAN DATA

Plan Title: Anderson Dam Breach, PMF and Pajaro PMF
Plan File : c:\19420-00-02001 Inundation\UPDATE\HECRAS\FINAL\pajaro.p08

Geometry Title: Pajaro - mouth to San Benito
Geometry File : c:\19420-00-02001 Inundation\UPDATE\HECRAS\FINAL\pajaro.g03

Flow Title :
Flow File :

Plan Summary Information:

Number of:	Cross Sections	= 123	Mulitple Openings	=	0
	Culverts	= 0	Inline Weirs	=	0
	Bridges	= 5			

Computational Information

Water surface calculation tolerance	= 0.003
Critical depth calculaton tolerance	= 0.003
Maximum number of interations	= 20
Maximum difference tolerance	= 0.1
Flow tolerance factor	= 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title:
Flow File :

Flow Data (cfs)

River Reach RS PF 1

Boundary Conditions

River	Reach	Profile	Upstream	Downstream

Profile Output Table - HEC-5Q

River	Reach	River Sta	W.S. Elev (ft)	Area (sq ft)	Hydr Rad 2/3 (ft)	Top Width (ft)	Mann Wtd Total	Q Total (cfs)
SAN BENITO	REACH-1	1667	153.24	50757.2	6.21	3277.1	0.043	78871.5
SAN BENITO	REACH-1	2467	153.29	47848.7	6.78	2698.0	0.060	78926.2
SAN BENITO	REACH-1	6067	153.53	48536.0	5.22	4051.4	0.045	78972.2
PAJARO RIVER	DS ELK	0	21.00	38262.8	4.80	3641.7	0.042	227313.3
PAJARO RIVER	DS ELK	1500	22.40	43382.1	5.20	3653.9	0.042	227315.0
PAJARO RIVER	DS ELK	2550	23.22	80256.8	6.64	4682.4	0.044	227315.8
PAJARO RIVER	DS ELK	3910	23.43	84199.5	6.39	5210.7	0.044	227325.5
PAJARO RIVER	DS ELK	4854	23.54	76136.7	6.61	4466.3	0.044	227327.7
PAJARO RIVER	DS ELK	5798	23.68	76575.9	6.63	4467.4	0.044	227329.3
PAJARO RIVER	DS ELK	7121	23.91	93635.6	6.56	5563.5	0.044	227330.9
PAJARO RIVER	DS ELK	8443	24.06	108778.2	6.16	7104.2	0.045	227352.8
PAJARO RIVER	DS ELK	9803	24.21	114344.9	6.22	7356.3	0.045	227358.2
PAJARO RIVER	DS ELK	11049	24.33	126197.5	6.21	8134.5	0.045	227360.7
PAJARO RIVER	DS ELK	12220	24.43	129554.6	6.10	8583.2	0.045	227402.1
PAJARO RIVER	DS ELK	13562	24.53	130272.8	5.87	9137.5	0.045	227407.0
PAJARO RIVER	DS ELK	13600	24.54	130301.8	5.87	9137.6	0.045	227407.0
PAJARO RIVER	DS ELK	13638	24.55	130366.7	5.87	9137.7	0.045	227455.8
PAJARO RIVER	DS ELK	13677	24.55	130395.7	5.87	9137.8	0.045	227456.0
PAJARO RIVER	DS ELK	14984	24.65	139076.7	5.90	9689.1	0.045	227460.3
PAJARO RIVER	DS ELK	16154	24.72	132334.7	5.69	9736.0	0.045	227523.4
PAJARO RIVER	DS ELK	17324	24.80	137035.1	5.80	9802.1	0.045	227527.0
PAJARO RIVER	DS ELK	18454	24.87	140314.4	5.65	10423.8	0.045	227602.0
PAJARO RIVER	DS ELK	19741	24.94	133161.9	5.40	10585.5	0.045	227605.6
PAJARO RIVER	DS ELK	20555	25.04	89280.6	4.31	9958.1	0.045	227690.5
PAJARO RIVER	DS ELK	20750	25.10	84660.1	4.02	10480.0	0.045	227776.9
PAJARO RIVER	DS ELK	20955	35.14	191736.7	6.77	10840.4	0.045	229783.3
PAJARO RIVER	DS ELK	21150	35.15	195321.7	6.83	10927.1	0.045	229783.8
PAJARO RIVER	DS ELK	22104	35.17	190224.2	6.60	11189.0	0.045	229786.0
PAJARO RIVER	DS ELK	23237	35.20	196131.4	6.49	11820.2	0.045	229788.0
PAJARO RIVER	DS ELK	24408	35.23	202901.5	6.45	12344.4	0.045	229790.1
PAJARO RIVER	DS ELK	25501	35.26	196551.6	6.24	12593.6	0.045	229791.8
PAJARO RIVER	DS ELK	27063	35.30	164853.1	5.82	11728.2	0.045	229838.1
PAJARO RIVER	DS ELK	28586	35.36	151875.3	5.41	12063.2	0.045	229846.0
PAJARO RIVER	DS ELK	29952	35.47	150469.6	4.99	13505.8	0.049	229850.7
PAJARO RIVER	DS ELK	29991	35.47	144643.3	4.86	13496.9	0.049	229850.8
PAJARO RIVER	DS ELK	30001	35.47	144548.0	4.85	13497.1	0.049	229850.8
PAJARO RIVER	DS ELK	30033	35.48	144672.1	4.86	13494.3	0.071	229917.2
PAJARO RIVER	DS ELK	30086	35.49	145058.0	4.85	13576.4	0.071	229917.4
PAJARO RIVER	DS ELK	31208	35.73	135691.5	4.43	14556.7	0.072	230061.7
PAJARO RIVER	DS ELK	31250	35.74	137998.2	4.48	14537.1	0.071	230062.0
PAJARO RIVER	DS ELK	31360	35.78	138452.2	4.49	14528.9	0.071	230133.8
PAJARO RIVER	DS ELK	31400	35.80	146636.0	4.65	14584.3	0.071	230134.1
PAJARO RIVER	Lower	32522	35.80	104865.7	4.32	11649.8	0.069	259058.5
PAJARO RIVER	Lower	34676	36.95	97052.7	4.89	8959.8	0.072	256165.7
PAJARO RIVER	Lower	35325	37.49	88478.6	4.95	8034.3	0.071	256351.2
PAJARO RIVER	Lower	36342	38.06	74393.9	4.61	7519.8	0.045	256529.6
PAJARO RIVER	Lower	37798	38.72	70538.1	4.24	8061.6	0.045	256763.3
PAJARO RIVER	Lower	38656	39.38	66767.9	3.42	10547.3	0.044	256927.9
PAJARO RIVER	Lower	39534	40.17	67074.7	3.53	10104.7	0.044	257174.8
PAJARO RIVER	Lower	40452	40.91	68144.2	3.77	9297.7	0.044	257342.3
PAJARO RIVER	Lower	41848	41.87	66572.2	3.33	10941.0	0.044	257483.7
PAJARO RIVER	Lower	43184	42.96	60233.8	3.50	9174.8	0.044	257574.8
PAJARO RIVER	Lower	44461	44.61	49292.6	3.03	9334.3	0.044	257684.0
PAJARO RIVER	Lower	46217	46.53	36288.4	2.82	7641.5	0.044	257727.8
PAJARO RIVER	Lower	47613	49.23	65818.4	4.01	8196.6	0.044	257736.4
PAJARO RIVER	Lower	48461	49.89	70452.9	4.01	8762.7	0.044	257738.0
PAJARO RIVER	Lower	49658	50.98	55100.5	3.43	8646.9	0.044	257746.0

River	Reach	River Sta	W.S. Elev (ft)	Area (sq ft)	Hydr Rad 2/3 (ft)	Top Width (ft)	Mann Wtd Total	Q Total (cfs)
PAJARO RIVER	Lower	50675	52.30	48641.5	3.21	8433.8	0.044	257754.5
PAJARO RIVER	Lower	52072	54.42	48763.1	2.79	10460.8	0.044	257763.6
PAJARO RIVER	Lower	53019	55.23	35757.6	4.11	4281.0	0.044	257773.5
PAJARO RIVER	Lower	54156	56.42	34858.7	3.51	5291.4	0.044	257781.3
PAJARO RIVER	Lower	55273	57.96	41586.8	3.12	7528.1	0.043	257788.1
PAJARO RIVER	Lower	56670	60.37	42404.2	4.77	4057.6	0.044	257803.5
PAJARO RIVER	Lower	57707	61.79	42549.6	5.11	3679.3	0.044	257811.1
PAJARO RIVER	Lower	59303	63.64	39984.8	4.62	4013.2	0.044	257845.8
PAJARO RIVER	Lower	60649	65.36	25704.3	5.12	2214.8	0.043	257950.1
PAJARO RIVER	Lower	60799	65.93	26961.4	5.25	2233.9	0.043	257979.9
PAJARO RIVER	Lower	60800	65.66	24682.9	4.95	2234.9	0.043	257979.9
PAJARO RIVER	Lower	60838	65.86	25116.4	5.00	2238.2	0.043	257980.0
PAJARO RIVER	Lower	60839	65.78	24797.9	4.96	2236.9	0.043	257980.0
PAJARO RIVER	Lower	60890	66.03	25348.1	5.03	2241.1	0.043	257980.1
PAJARO RIVER	Lower	62326	70.01	32785.1	6.04	2199.3	0.044	258114.0
PAJARO RIVER	Lower	63621	71.69	25910.7	5.87	1814.3	0.044	258115.0
PAJARO RIVER	Lower	64835	73.74	19676.9	6.43	1197.4	0.043	258121.2
PAJARO RIVER	Lower	66210	77.04	15423.9	6.32	962.8	0.044	258125.4
PAJARO RIVER	Lower	67363	83.74	23850.9	7.13	1242.0	0.044	258128.0
PAJARO RIVER	Lower	68365	84.57	17558.2	6.84	967.3	0.044	258129.0
PAJARO RIVER	Lower	69346	87.72	17196.2	7.10	897.0	0.044	258129.5
PAJARO RIVER	Lower	70175	89.62	19266.6	8.07	996.1	0.043	258132.6
PAJARO RIVER	Lower	71177	93.54	24105.5	9.72	1116.8	0.042	258133.5
PAJARO RIVER	Lower	72219	89.81	9168.5	8.27	371.0	0.040	258134.1
PAJARO RIVER	Lower	73048	101.45	25817.4	8.74	983.2	0.044	258137.4
PAJARO RIVER	Lower	74009	102.83	32222.6	6.69	1843.1	0.044	258140.4
PAJARO RIVER	Lower	75466	104.24	51233.0	5.61	3832.3	0.044	258147.7
PAJARO RIVER	Lower	76599	104.89	54127.0	5.60	4066.8	0.046	258153.2
PAJARO RIVER	Lower	77681	104.66	31262.3	4.86	2900.1	0.044	258159.1
PAJARO RIVER	Lower	79488	106.97	42271.8	6.70	2428.4	0.045	258233.9
PAJARO RIVER	Lower	79539	107.18	46505.7	7.29	2346.9	0.044	258234.0
PAJARO RIVER	Lower	79564	107.20	46565.3	7.30	2345.2	0.044	258264.6
PAJARO RIVER	Lower	79615	107.28	48337.8	7.46	2363.9	0.047	258265.0
PAJARO RIVER	Lower	80964	107.90	50383.1	8.99	1847.3	0.047	258271.5
PAJARO RIVER	Lower	82335	108.05	30130.3	7.34	1497.6	0.046	258312.0
PAJARO RIVER	Lower	83788	107.62	15736.5	7.84	705.1	0.041	258315.4
PAJARO RIVER	Lower	84811	109.08	14132.5	7.31	694.5	0.042	258394.6
PAJARO RIVER	Lower	87705	119.47	14356.2	10.23	406.7	0.040	258650.4
PAJARO RIVER	Lower	90339	125.18	18052.0	11.61	425.4	0.040	258674.3
PAJARO RIVER	Lower	93817	129.35	42227.1	8.68	1642.6	0.040	258677.9
PAJARO RIVER	Lower	95864	129.65	35308.3	9.75	1137.9	0.040	258679.0
PAJARO RIVER	Lower	98012	130.17	31424.8	8.96	1157.6	0.040	258680.0
PAJARO RIVER	Lower	99445	130.54	26352.6	11.13	685.9	0.040	258707.8
PAJARO RIVER	Lower	100000	125.59	11709.3	7.25	591.5	0.042	258503.1
PAJARO RIVER	Lower	102000	138.52	18012.3	9.37	615.3	0.040	258756.5
PAJARO RIVER	Lower	104000	141.29	15253.9	9.08	538.1	0.040	258781.5
PAJARO RIVER	Lower	106000	146.57	19808.8	4.84	1839.0	0.042	258809.4
PAJARO RIVER	Lower	108000	152.51	47272.7	6.37	2930.3	0.043	258822.1
PAJARO RIVER	Lower	110000	153.24	46459.7	6.92	2536.9	0.042	258844.4
PAJARO RIVER	Upper	111586	153.24	37261.8	6.56	2158.5	0.044	179973.0
PAJARO RIVER	Upper	112793	154.12	38576.4	6.68	2175.5	0.044	101275.3
PAJARO RIVER	Upper	114000	154.24	38252.0	6.65	2177.9	0.044	101505.1
ELKHORN	SLOUGH	0	4.60	13796.5	2.76	2999.5	0.035	2018.7
ELKHORN	SLOUGH	3450	5.83	12648.7	2.61	2991.6	0.035	28554.2
ELKHORN	SLOUGH	7200	7.43	12353.5	2.57	2991.7	0.035	28557.4
ELKHORN	SLOUGH	11000	10.32	8612.7	2.33	2422.4	0.035	28568.2
ELKHORN	SLOUGH	14550	12.84	15458.3	2.81	3285.3	0.035	28574.5
ELKHORN	SLOUGH	19000	14.21	11743.9	2.88	2398.2	0.035	28584.8
ELKHORN	SLOUGH	21500	14.88	23429.6	2.87	4807.9	0.035	28596.0
ELKHORN	SLOUGH	26500	21.28	4125.4	3.20	718.7	0.035	28683.8
ELKHORN	SLOUGH	30150	27.79	6401.2	3.91	828.1	0.035	28689.2
ELKHORN	SLOUGH	33250	29.34	12868.6	4.50	1346.1	0.035	28690.8
ELKHORN	SLOUGH	36400	29.65	24176.4	5.28	1992.6	0.035	28692.3
ELKHORN	SLOUGH	39000	29.71	40480.0	4.95	3671.2	0.035	28701.5
ELKHORN	SLOUGH	40750	31.11	5695.5	4.84	533.1	0.060	28798.0
ELKHORN	SLOUGH	43050	35.80	2682.0	5.63	189.5	0.045	28924.4

APPENDIX E

Flood Inundation Maps

PROFILE OF CRESTS AND TIMES FOR "FAIR WEATHER" BREACH FLOWS ALONG NORTHWEST VALLEY

DISTANCE FROM DAM - MILE	MAX ELEV FEET	MAX FLOW CFS	TIME MAX ELEV	MAX VEL FPS	FLOOD ELEV FEET	TIME OF WAVE ARRIVAL	MAX DEPTH X VEL.	MAXIMUM DEPTH-FT
0.5	425.6	594000	2 HR. 8 MIN	14.4	400	0 HR. 0 MIN	368	25.6
2.0	374.9	580780	2 HR. 14 MIN	11.3	340	0 HR. 18 MIN	392	34.9
4.0	320.6	535847	2 HR. 32 MIN	7.1	300	0 HR. 42 MIN	146	20.6
6.0	281.3	492860	2 HR. 50 MIN	8.0	263	1 HR. 2 MIN	147	18.3
8.0	267.9	339723	3 HR. 23 MIN	6.3	242	1 HR. 20 MIN	162	25.9
8.5	263.1	332886	3 HR. 26 MIN	10.3	240	1 HR. 24 MIN	237	23.1
9.0	255.2	327132	3 HR. 29 MIN	10.6	231	1 HR. 34 MIN	258	24.2
10.0	241.5	291529	3 HR. 53 MIN	11.8	208	1 HR. 53 MIN	394	33.5
12.0	196.3	247500	4 HR. 44 MIN	5.6	175	2 HR. 33 MIN	118	21.3
14.0	167.7	206593	5 HR. 44 MIN	3.7	155	3 HR. 28 MIN	47	12.7
16.0	140.3	179244	6 HR. 38 MIN	6.3	135	4 HR. 14 MIN	33	5.3
18.0	110.6	170171	7 HR. 23 MIN	3.2	105	4 HR. 48 MIN	18	5.6
20.0	82.2	163146	8 HR. 11 MIN	4.9	75	5 HR. 48 MIN	35	7.2
22.0	53.2	159005	8 HR. 47 MIN	3.4	50	6 HR. 22 MIN	11	3.2
24.0	29.1	149912	9 HR. 50 MIN	2.6	22	6 HR. 48 MIN	18	7.1
26.0	13.9	132810	11 HR. 17 MIN	2.6	8	7 HR. 57 MIN	16	5.9
27.5	7.0	115596	13 HR. 23 MIN	1.0	4	8 HR. 42 MIN	3	3.0
32.0	4.8	70129	16 HR. 35 MIN	0.6	4	9 HR. 42 MIN	0	0.8
33.9	4.0	69610	16 HR. 50 MIN	0.6	4	14 HR. 12 MIN	0	0.0

PROFILE OF CRESTS AND TIMES FOR "FAIR WEATHER" BREACH FLOWS ALONG SOUTHEAST VALLEY

DISTANCE FROM DAM - MILE	MAX ELEV FEET	MAX FLOW CFS	TIME MAX ELEV-HR.	MAX VEL FPS	FLOOD ELEV FEET	TIME OF WAVE ARRIVAL-HR.	DEPTH X VEL.	MAXIMUM DEPTH-FT
0.5	419.4	710000	2 HR. 0 MIN	12.6	400	0 HR. 0 MIN	244	19.4
2.0	378.3	625576	2 HR. 12 MIN	8.5	345	0 HR. 23 MIN	283	33.3
4.0	331.5	619955	2 HR. 36 MIN	6.5	318	0 HR. 54 MIN	88	13.5
5.0	312.2	589152	2 HR. 54 MIN	7.0	295	1 HR. 10 MIN	120	17.2
6.0	292.3	579701	3 HR. 3 MIN	7.2	279	1 HR. 26 MIN	95	13.3
8.0	252.8	541734	3 HR. 30 MIN	5.7	242	1 HR. 57 MIN	61	10.8
10.0	219.0	487468	4 HR. 6 MIN	4.5	210	2 HR. 28 MIN	41	9.0
12.0	193.6	450505	4 HR. 42 MIN	4.7	181	2 HR. 59 MIN	59	12.6
14.0	171.7	418418	5 HR. 18 MIN	4.0	150	3 HR. 30 MIN	87	21.7
16.0	154.6	345878	11 HR. 27 MIN	4.4	139	3 HR. 54 MIN	69	15.6
18.0	154.4	89723	11 HR. 36 MIN	1.5	130	4 HR. 19 MIN	36	24.4
18.3	153.2	88719	11 HR. 43 MIN	7.4	127	4 HR. 23 MIN	193	26.2
20.3	148.8	87842	11 HR. 54 MIN	7.5	124	4 HR. 30 MIN	187	24.8

PROFILE OF CRESTS AND TIMES FOR "FAIR WEATHER" BREACH FLOWS ALONG PAJARO RIVER

DISTANCE FROM DAM - MILE	MAX ELEV FEET	MAX FLOW CFS	TIME MAX ELEV-HR.	MAX VEL FPS	FLOOD ELEV FEET	TIME OF WAVE ARRIVAL-HR.	DEPTH X VEL.	MAXIMUM DEPTH-FT
20.3	148.8	87842	11 HR. 54 MIN	7.5	124	4 HR. 30 MIN	187	24.8
20.8	138.4	87826	11 HR. 59 MIN	8.6	123	4 HR. 35 MIN	131	15.4
21.1	138.4	88784	12 HR. 2 MIN	5.0	123	4 HR. 38 MIN	77	15.4
22.2	133.0	88803	12 HR. 17 MIN	6.4	121	4 HR. 53 MIN	77	12.0
24.1	108.2	88757	12 HR. 45 MIN	4.7	97	5 HR. 21 MIN	52	11.2
26.0	95.3	88643	13 HR. 9 MIN	11.2	84	5 HR. 45 MIN	127	11.3
28.1	84.3	88610	13 HR. 28 MIN	11.2	78	6 HR. 4 MIN	71	6.3
30.1	63.3	88539	13 HR. 43 MIN	7.4	52	6 HR. 19 MIN	84	11.3
32.0	49.5	88400	14 HR. 4 MIN	8.7	46	6 HR. 40 MIN	31	3.5
34.0	37.8	88371	14 HR. 28 MIN	4.8	34	7 HR. 4 MIN	18	3.8
35.9	28.4	81231	15 HR. 2 MIN	4.3	28	7 HR. 38 MIN	2	0.4
36.0	28.1	81218	15 HR. 2 MIN	5.7	28	7 HR. 38 MIN	1	0.1
38.0	18.0	73604	16 HR. 38 MIN	6.8	16	9 HR. 14 MIN	13	2.0
40.0	16.5	69172	18 HR. 29 MIN	1.7	11	11 HR. 5 MIN	9	5.5
41.9	14.1	68698	19 HR. 48 MIN	5.0	8	12 HR. 24 MIN	30	6.1

PROFILE OF CRESTS AND TIMES FOR "FAIR WEATHER" BREACH FLOWS ALONG ELKHORN SLOUGH

DISTANCE FROM DAM - MILE	MAX ELEV FEET	MAX FLOW CFS	TIME MAX ELEV-HR.	MAX VEL FPS	FLOOD ELEV FEET	TIME OF WAVE ARRIVAL-HR.	DEPTH X VEL.	MAXIMUM DEPTH-FT
35.9	28.4	7348	15 HR. 2 MIN	5.4	20	7 HR. 38 MIN	45	8.4
37.2	23.1	6790	17 HR. 7 MIN	0.6	17	9 HR. 43 MIN	4	6.1
39.1	17.0	6698	19 HR. 39 MIN	4.3	12	12 HR. 15 MIN	21	5.0
41.3	9.9	6545	21 HR. 51 MIN	1.1	7	14 HR. 27 MIN	3	2.9
44.1	4.6	6527	25 HR. 36 MIN	0.1	4.6	18 HR. 12 MIN	0	0.0

PROFILE OF CRESTS AND TIMES FOR IDF BREACH FLOWS ALONG NORTHWEST VALLEY

DISTANCE FROM DAM - MILE	MAX ELEV FEET	MAX FLOW CFS	TIME MAX ELEV	MAX VEL FPS	FLOOD ELEV FEET	TIME OF WAVE ARRIVAL	MAX DEPTH X VEL.	MAXIMUM DEPTH-FT
0.5	428.1	746884	2 HR. 0 MIN	16.1	400	0 HR. 3 MIN	453	28.1
2.0	376.0	718169	2 HR. 6 MIN	12.1	340	0 HR. 14 MIN	435	36.0
4.0	322.6	679674	2 HR. 24 MIN	7.5	300	0 HR. 34 MIN	169	22.6
6.0	283.3	642079	2 HR. 42 MIN	9.0	263	0 HR. 55 MIN	183	20.3
8.0	273.7	478490	3 HR. 18 MIN	6.4	242	1 HR. 21 MIN	202	31.7
8.5	268.9	474044	3 HR. 24 MIN	11.2	240	1 HR. 26 MIN	325	28.9
9.0	262.2	462948	3 HR. 30 MIN	11.6	231	1 HR. 30 MIN	362	31.2
10.0	247.3	437163	3 HR. 42 MIN	12.6	208	1 HR. 37 MIN	497	39.3
12.0	199.3	406081	4 HR. 24 MIN	5.9	175	1 HR. 56 MIN	144	24.3
14.0	171.1	361461	5 HR. 24 MIN	4.6	155	2 HR. 22 MIN	74	16.1
16.0	143.6	325542	6 HR. 0 MIN	5.7	135	2 HR. 39 MIN	49	8.6
18.0	113.5	395347	6 HR. 36 MIN	4.0	105	3 HR. 16 MIN	34	8.5
20.0	87.6	382838	7 HR. 24 MIN	5.6	75	3 HR. 56 MIN	70	12.6
22.0	56.6	378840	7 HR. 48 MIN	4.4	50	4 HR. 30 MIN	29	6.6
24.0	32.1	372912	8 HR. 30 MIN	3.1	22	5 HR. 15 MIN	32	10.1
26.0	17.0	359640	9 HR. 18 MIN	2.7	8	6 HR. 16 MIN	24	9.0
27.5	11.1	322930	11 HR. 30 MIN	1.6	4	7 HR. 13 MIN	11	7.1
32.0	7.4	234172	13 HR. 48 MIN	1.3	4	11 HR. 59 MIN	5	3.4
33.9	4.0	232021	14 HR. 6 MIN	1.9	4	13 HR. 55 MIN	0	0.0

PROFILE OF CRESTS AND TIMES FOR IDF BREACH FLOWS ALONG SOUTHEAST VALLEY

DISTANCE FROM DAM - MILE	MAX ELEV FEET	MAX FLOW CFS	TIME MAX ELEV-HR.	MAX VEL FPS	FLOOD ELEV FEET	TIME OF WAVE ARRIVAL-HR.	DEPTH X VEL.	MAXIMUM DEPTH-FT
0.5	426.5	882653	2 HR. 0 MIN	15.7	400	0 HR. 3 MIN	416	26.5
2.0	380.4	858924	2 HR. 6 MIN	9.6	345	0 HR. 14 MIN	338	35.4
4.0	333.3	817431	2 HR. 25 MIN	7.2	318	0 HR. 37 MIN	110	15.3
5.0	314.3	797923	2 HR. 34 MIN	7.8	295	0 HR. 48 MIN	150	19.3
6.0	294.1	776590	2 HR. 43 MIN	8.0	279	0 HR. 59 MIN	121	15.1
8.0	254.3	739262	3 HR. 4 MIN	6.5	242	1 HR. 23 MIN	80	12.3
10.0	220.5	674157	3 HR. 34 MIN	5.1	210	1 HR. 53 MIN	53	10.5
12.0	195.1	592153	4 HR. 6 MIN	5.2	181	2 HR. 28 MIN	73	14.1
14.0	172.9	533040	4 HR. 43 MIN	4.4	150	3 HR. 4 MIN	101	22.9
16.0	158.7	442658	11 HR. 11 MIN	4.9	139	3 HR. 41 MIN	97	19.7
18.0	158.6	102596	11 HR. 16 MIN	1.3	130	4 HR. 41 MIN	38	28.6
18.3	157.5	102491	11 HR. 16 MIN	6.5	127	4 HR. 55 MIN	199	30.5
20.3	154.8	102184	11 HR. 23 MIN	3.8	124	5 HR. 34 MIN	116	30.8

PROFILE OF CRESTS AND TIMES FOR IDF BREACH FLOWS ALONG PAJARO RIVER

DISTANCE FROM DAM - MILE	MAX ELEV FEET	MAX FLOW CFS	TIME MAX ELEV-HR.	MAX VEL FPS	FLOOD ELEV FEET	TIME OF WAVE ARRIVAL-HR.	DEPTH X VEL.	MAXIMUM DEPTH-FT
20.3	154.8	102184	11 HR. 23 MIN	3.8	124	5 HR. 34 MIN	116	30.8
20.8	153.2	180393	11 HR. 32 MIN	7.9	123	5 HR. 44 MIN	238	30.2
21.1	153.2	258874	11 HR. 35 MIN	7.9	123	5 HR. 47 MIN	240	30.2
22.2	141.3	258607	11 HR. 45 MIN	17.0	121	5 HR. 57 MIN	345	20.3
24.1	129.4	258366	12 HR. 1 MIN	6.8	97	6 HR. 12 MIN	220	32.4
26.0	107.6	258490	12 HR. 16 MIN	19.7	84	6 HR. 27 MIN	464	23.6
28.1	101.5	258010	12 HR. 32 MIN	13.9	78	6 HR. 43 MIN	325	23.5
30.1	70.0	257828	12 HR. 41 MIN	11.2	52	6 HR. 53 MIN	202	18.0
32.0	54.4	257772	12 HR. 56 MIN	10.8	46	7 HR. 8 MIN	91	8.4
34.0	41.9	257501	13 HR. 16 MIN	5.9	34	7 HR. 28 MIN	47	7.9
35.9	35.8	231205	13 HR. 48 MIN	3.4	28	7 HR. 59 MIN	27	7.8
36.0	35.7	231183	13 HR. 49 MIN	3.8	28	8 HR. 0 MIN	29	7.7
38.0	25.0	229693	15 HR. 26 MIN	3.6	16	9 HR. 38 MIN	33	9.0
40.0	24.2	227548	16 HR. 51 MIN	2.5	11	11 HR. 2 MIN	33	13.2
41.9	21.0	227134	17 HR. 39 MIN	7.3	8	11 HR. 50 MIN	95	13.0

PROFILE OF CRESTS AND TIMES FOR IDF BREACH FLOWS ALONG ELKHORN SLOUGH

DISTANCE FROM DAM - MILE	MAX ELEV FEET	MAX FLOW CFS	TIME MAX ELEV-HR.	MAX VEL FPS	FLOOD ELEV FEET	TIME OF WAVE ARRIVAL-HR.	DEPTH X VEL.	MAXIMUM DEPTH-FT
35.9	35.8	28891	13 HR. 48 MIN	10.8	20	7 HR. 59 MIN	170	15.8
37.2	29.7	28703	14 HR. 58 MIN	1.2	17	9 HR. 10 MIN	15	12.7
39.1	21.3	28688	16 HR. 19 MIN	7.0	12	10 HR. 31 MIN	64	9.3
41.3	12.8	28574	17 HR. 36 MIN	1.9	7	11 HR. 47 MIN	11	5.8
44.1	4.6	28551	19 HR. 19 MIN	0.2	4.6	13 HR. 31 MIN	0	0.0

SCALE NO SCALE

SHEET 2

VERIFY SCALES 0 1/2"

BAR IS 1/2 INCH ON ORIGINAL DRAWING. IF NOT 1/2 INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS

MEAD & HUNT

Santa Clara Valley Water District

REVIEWED BY:

ACCEPTED BY: 12-P. Wolfe

DATE MARCH 2003
DESIGN MOK
DRAWN SG
CHECKED MOK

REFERENCE INFORMATION AND NOTES

LEGEND

- FW: 8 HR 47 MIN, 13.2 FEET — TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR FAIR WEATHER SCENARIO
- 22.0 MILES — MILES FROM DAM
- CROSS SECTION
- IDF: 7 HR 48 MIN, 16.6 FEET — TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR IDF SCENARIO

IDF INUNDATION LIMITS

FAIR WEATHER INUNDATION LIMITS

FW
16 HR 35 MIN
0.8 FEET

FW
16 HR 50 MIN
0.0 FEET

33.9 MILES
END OF ROUTIN

NOTE:

1. THE RELATIVE COVERAGE OF THIS MAP COMPARED TO THE OTHER MAPS CAN BE SEEN ON THE SHEET INDEX PRESENTED ON SHEET 1.

ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS
24.0 TO 33.9 MILES NORTH OF DAM

MEAD & HUNT

VERIFY SCALES
BAR IS 1/2 INCH ON ORIGINAL DRAWING
IF NOT 1/2 INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 1/2"

SCALE: 1" = 4000'

SHEET: 3

Santa Clara Valley Water District

ACCEPTED BY: R.P. Volpe

REVIEWED BY: V.R. Moreau

DATE	DESIGN	DRAWN	CHECKED
MARCH 2003	MOK	SC	MOK

REFERENCE INFORMATION AND NOTES

1. BACKGROUND MAPPING SOURCES:
   A. ORTHOPHOTOS PRODUCED BY TRIATHON LTD, APRIL 2001
   B. USGS 7.5 MINUTE QUADRANGLES
      - NILES, 1980
      - MILPITAS, 1980
      - MOUNTAIN VIEW, 1991
      - NEWARK, 1980

NO DIGITAL CONTOURS AVAILABLE FOR THIS AREA

13 HR 28 MIN
3.0 FEET

IDF INUNDATION LIMITS

NOTE:

1. THE RELATIVE COVERAGE OF THIS MAP COMPARED TO THE OTHER MAPS CAN BE SEEN ON THE SHEET INDEX PRESENTED ON SHEET 1.

LEGEND

FW
8 HR 47 MIN
13.2 FEET

22.0 MILES

IDF
7 HR 48 MIN
16.6 FEET

- TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR FAIR WEATHER SCENARIO
- MILES FROM DAM
- CROSS SECTION
- TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR IDF SCENARIO

REFERENCE INFORMATION AND NOTES
1. BACKGROUND MAPPING SOURCES:
   A. ORTHOPHOTOS PRODUCED BY THE THOMAS GUIDE, APRIL 2001
   B. USGS 7.5 MINUTE QUADRANGLES – MILPITAS, 1980

DATE MARCH 2003
DESIGN MDK
DRAWN SG
CHECKED MDK

Santa Clara Valley Water District

ACCEPTED BY:

REVIEWED BY:

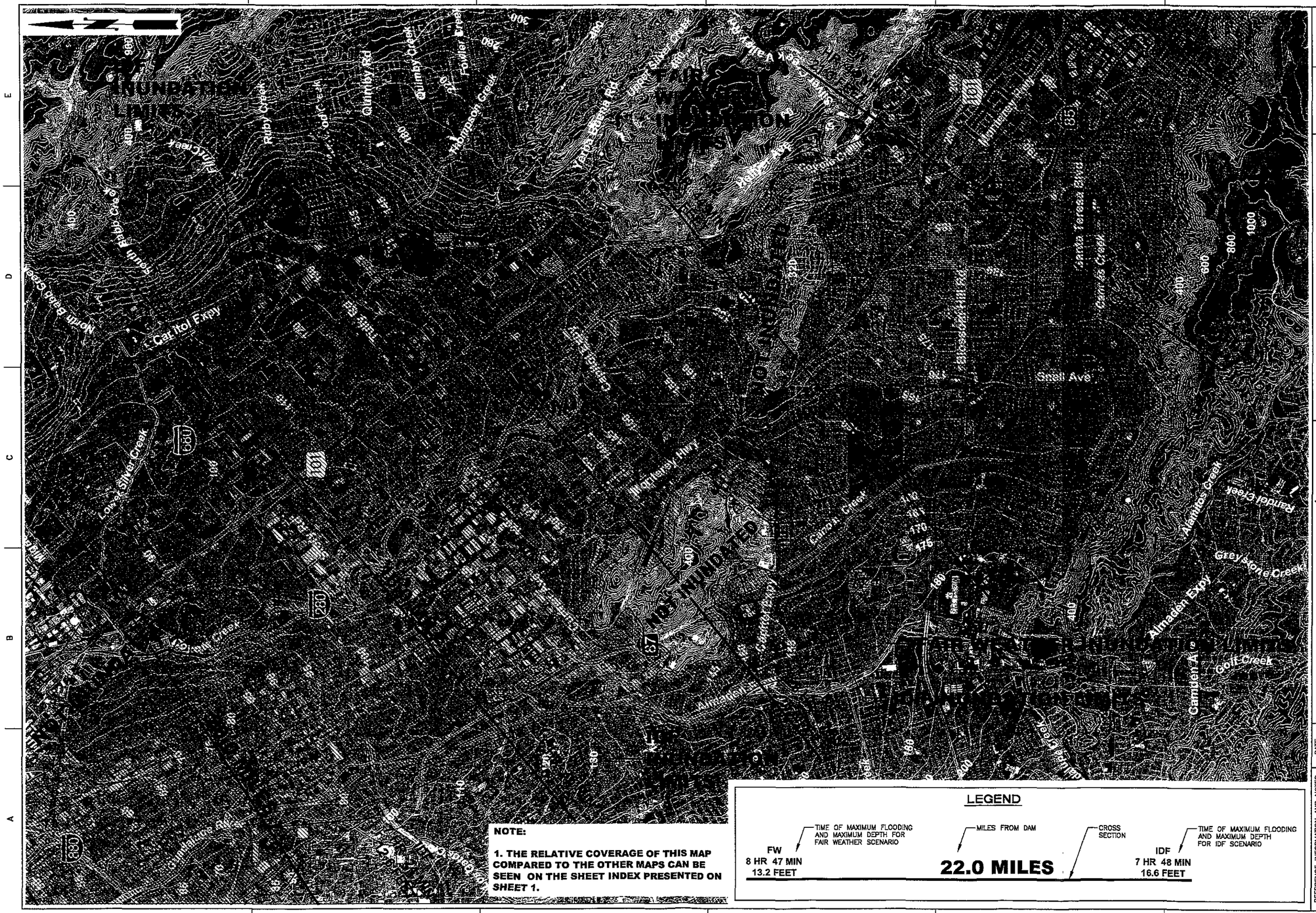
ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS
18.0 TO 27.5 MILES NORTH OF DAM

MEAD & HUNT

VERIFY SCALES
0 1/2"
BAR IS 1/2 INCH ON ORIGINAL DRAWING IF NOT 1/2 INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE 1" = 4000'

SHEET 4


INUNDATION LIMITS
MOST INUNDATED
Guadalupe River
Coyote Creek
Los Alamitos Creek
Almaden Expy
Camden Ave
Golf Creek
Greystone Creek
Ross Creek
Canoas Creek
Santa Teresa Blvd
Monterey Hwy
Capitol Expy
Tully Rd
Quimby Rd
Yerba Buena Rd
Penitencia Creek
Piedmont Rd
Silver Creek
Lower Silver Creek
Thompson Creek
Fowler Creek
Ruby Creek
Quimby Creek
Penitencia Creek
Yerba Buena Creek
Silver Creek
Shell Ave
Camden Ave
Almaden Expy
Golf Creek
Greystone Creek
Los Alamitos Creek
Canoas Creek
Ross Creek
Guadalupe River
Coyote Creek
Capitol Expy
Monterey Hw

ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS
4.0 TO 12.0 MILES NORTH OF DAM

MEAD & HUNT

VERIFY SCALES
0 1/2"
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SCALE
1" = 4000'

SHEET
6

Santa Clara Valley Water District

ACCEPTED BY: R.F. Wolpe

REVIEWED BY: M.T. Morrow

DATE: MARCH 2003
DESIGN MDK
DRAWN SG
CHECKED MDK

REFERENCE INFORMATION AND NOTES:
1. BACKGROUND MAPPING SOURCES:
A. ORTHOPHOTOS PRODUCED BY TRIATHON LTD, APRIL 2001

LEGEND

FW
8 HR 47 MIN
13.2 FEET
← TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR FAIR WEATHER SCENARIO

22.0 MILES
← MILES FROM DAM

← CROSS SECTION

IDF
7 HR 48 MIN
16.6 FEET
← TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR IDF SCENARIO

2000 Feet

Coyote Reservoir
Anderson Dam
Fisher Creek
Spring Creek
San Felipe Rd
Metcalf Rd
Cribari Creek
Thompson Creek
Upper Silver Creek
Silver Creek
Hellyer Ave
Highway 101
Monterey Hwy
Santa Teresa Blvd
Bailey Ave
Coyote Creek
Dry Creek
Blossom Hill Rd
Uvas Rd
McKean Rd
Llagas Creek
Calero Reservoir
Big Ck
Gilroy

ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS
0.0 TO 4.0 MILES NORTH
0.0 TO 8.0 MILES SOUTH OF DAM

MEAD & HUNT

VERIFY SCALES
0 1/2"
BAR IS 1/2 INCH ON ORIGINAL DRAWING IF NOT EQUAL ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE
1" = 4000'

SHEET
7

Santa Clara Valley Water District

ACCEPTED BY:

REVIEWED BY:

DATE	DESIGN	DRAWN	CHECKED
MARCH 2003	MDK	SG	MDK

REFERENCE INFORMATION AND NOTES
1. BACKGROUND MAPPING SOURCES:
A. ORTHOPHOTOS PRODUCED BY TRIATHON LTD, APRIL 2001

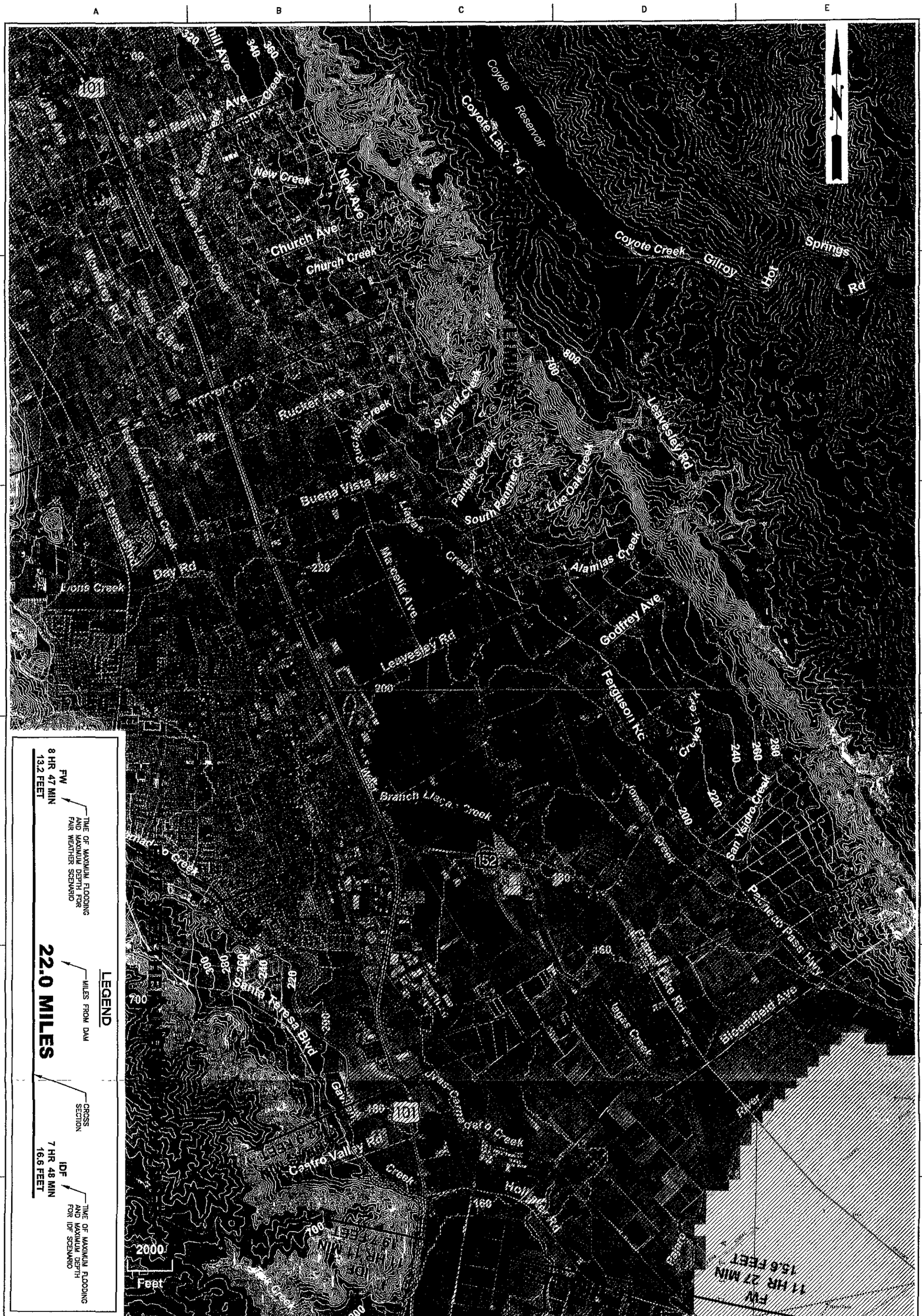
LEGEND

FW
8 HR 47 MIN
13.2 FEET
← TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR FAIR WEATHER SCENARIO

22.0 MILES
← MILES FROM DAM

← CROSS SECTION

IDF
7 HR 48 MIN
16.6 FEET
← TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR IDF SCENARIO



REFERENCE INFORMATION AND NOTES

1. BACKGROUND MAPPING SOURCES:
   A. ORTHOPHOTOS PRODUCED BY TRIATHON LTD., APRIL 2001
   B. USGS 7.5 MINUTE QUADRANGLES
      – CHITTENDEN, 1993
      – SAN FELIPE, 1971

DATE	MARCH 2003
DESIGN	MOK
DRAWN	SG
CHECKED	MOK

Santa Clara Valley Water District

ACCEPTED BY: R. Volpe

REVIEWED BY: M. Mowen

ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS
5.0 TO 16.0 MILES SOUTH OF DAM

MEAD & HUNT ENGINEERS ARCHITECTS SCIENTISTS PLANNERS

VERIFY SCALES
0 1/2"
BAR IS 1/2 INCH ON ORIGINAL DRAWING IF NOT 1/2 INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE 1" = 4000'

SHEET 8

LEGEND

FW
8 HR 47 MIN
13.2 FEET
— TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR FAIR WEATHER SCENARIO

22.0 MILES
— MILES FROM DAM

— CROSS SECTION

IDF
7 HR 48 MIN
16.6 FEET
— TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR IDF SCENARIO

FAIR WEATHER INUNDATION LIMITS

IDF INUNDATION LIMITS

IDF
11 HR 11 MIN
19.2 FEET

16.0 MILES

IDF
11 HR 16 MIN
28.6 FEET

18.0 MILES

18.3 MILES

IDF
11 HR 16 MIN
30.5 FEET

ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS
18.0 TO 27.5 MILES NORTH OF DAM

MEAD & HUNT ARCHITECTURE ENGINEERING PLANNING

SCALE 1" = 4000'

SHEET 9

VERIFY SCALES
0 1/2"
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Santa Clara Valley Water District

DATE	DESIGN	DRAWN	CHECKED
MARCH 2003	MJK	SG	MJK

ACCEPTED BY: R.E. Wolfe

REVIEWED BY: M.K. Jensen

REFERENCE INFORMATION AND NOTES

1. BACKGROUND MAPPING SOURCES:
   A. ORTHOPHOTOS PRODUCED BY: TRAITHON LTD. APRIL 2001.
   B. USGS 7.5 MINUTE QUADRANGLES
      – CHITTENDEN, 1983
      – SAN FELIPE, 1971
      – SAN JUAN BAUTISTA, 1993
      – HOLLISTER, 1995

IDF INUNDATION LIMITS

IDF INUNDATION LIMITS

IDF
11 HR 11 MIN
19.7 FEET

IDF
11 HR 16 MIN
28.6 FEET

IDF
11 HR 16 MIN
30.5 FEET

IDF
11 HR 23 MIN
30.8 FEET

IDF
11 HR 32 MIN
30.2 FEET

FW
11 HR 59 MIN
15.4 FEET

FW
12 HR 2 MIN
15.4 FEET

IDF
11 HR 35 MIN
30.2 FEET

IDF
11 HR 45 MIN
20.3 FEET

IDF
12 HR 1 MIN
32.4 FEET

3.0 MILES

18.3 MILES

20.3 MILES

20.8 MILES

21.1 MILES

22.0 MILES

24.1 MILES

NOTE:

1. THE RELATIVE COVERAGE OF THIS MAP COMPARED TO THE OTHER MAPS CAN BE SEEN ON THE SHEET INDEX PRESENTED ON SHEET 1.

LEGEND

FW
8 HR 47 MIN
13.2 FEET
← TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR FAIR WEATHER SCENARIO

22.0 MILES
← MILES FROM DAM

← CROSS SECTION

IDF
7 HR 48 MIN
16.6 FEET
← TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR IDF SCENARIO

2000 Feet

ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS
16.0 TO 24.1 MILES SOUTH OF DAM

VERIFY SCALES
0 1/2"
BAR IS 1/2 INCH ON ORIGINAL DRAWING IF NOT 1/2 INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE
1" = 4000'

SHEET
10

MEAD & HUNT

Santa Clara Valley Water District

ACCEPTED BY: R. E. Volpe

REVIEWED BY: W. Mouw

DATE
MARCH 2003

DESIGN
MDK

DRAWN
SG

CHECKED
MDK

REFERENCE INFORMATION AND NOTES

1. BACKGROUND MAPPING SOURCES:
   A. ORTHOPHOTOS PRODUCED BY TRIATHON LTD, APRIL 2001
   B. USGS 7.5 MINUTE QUADRANGLES
      – CHITTENDEN, 1993
      – SAN FELIPE, 1971
      – SAN JUAN BAUTISTA, 1993
      – HOLLISTER, 1995

LEGEND

FW
8 HR 47 MIN
13.2 FEET
— TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR FAIR WEATHER SCENARIO

22.0 MILES
— MILES FROM DAM

— CROSS SECTION

IDF
7 HR 48 MIN
16.6 FEET
— TIME OF MAXIMUM FLOODING AND MAXIMUM DEPTH FOR IDF SCENARIO

IDF INUNDATION LIMITS

IDF INUNDATION LIMITS

FAIR WEATHER INUNDATION LIMITS

IDF INUNDATION LIMITS

IDF INUNDATION LIMITS

FAIR WEATHER INUNDATION LIMITS

IDF INUNDATION LIMITS

FW 13 HR 28 MIN 6.3 FEET — 28.1 MILES

IDF 12 HR 16 MIN 23.6 FEET — 26.0 MILES

FW 13 HR 9 MIN 11.3 FEET

IDF 12 HR 32 MIN 23.5 FEET

IDF 12 HR 41 MIN 18.0 FEET — 30.1 MILES

FW 13 HR 42 MIN 11.3 FEET

FW 14 HR 4 MIN 3.5 FEET — 32.0 MILES

IDF 12 HR 56 MIN 8.4 FEET

IDF 13 HR 16 MIN 7.9 FEET

FW 14 HR 28 MIN 3.8 FEET — 34.0 MILES

ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS
26.0 TO 34.0 MILES NORTH OF DAM

MEAD & HUNT

SCALE 1" = 4000'

SHEET 11

VERIFY SCALES
0 1/2"
BAR IS 1/2 INCH ON ORIGINAL DRAWING IF NOT 1/2 INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

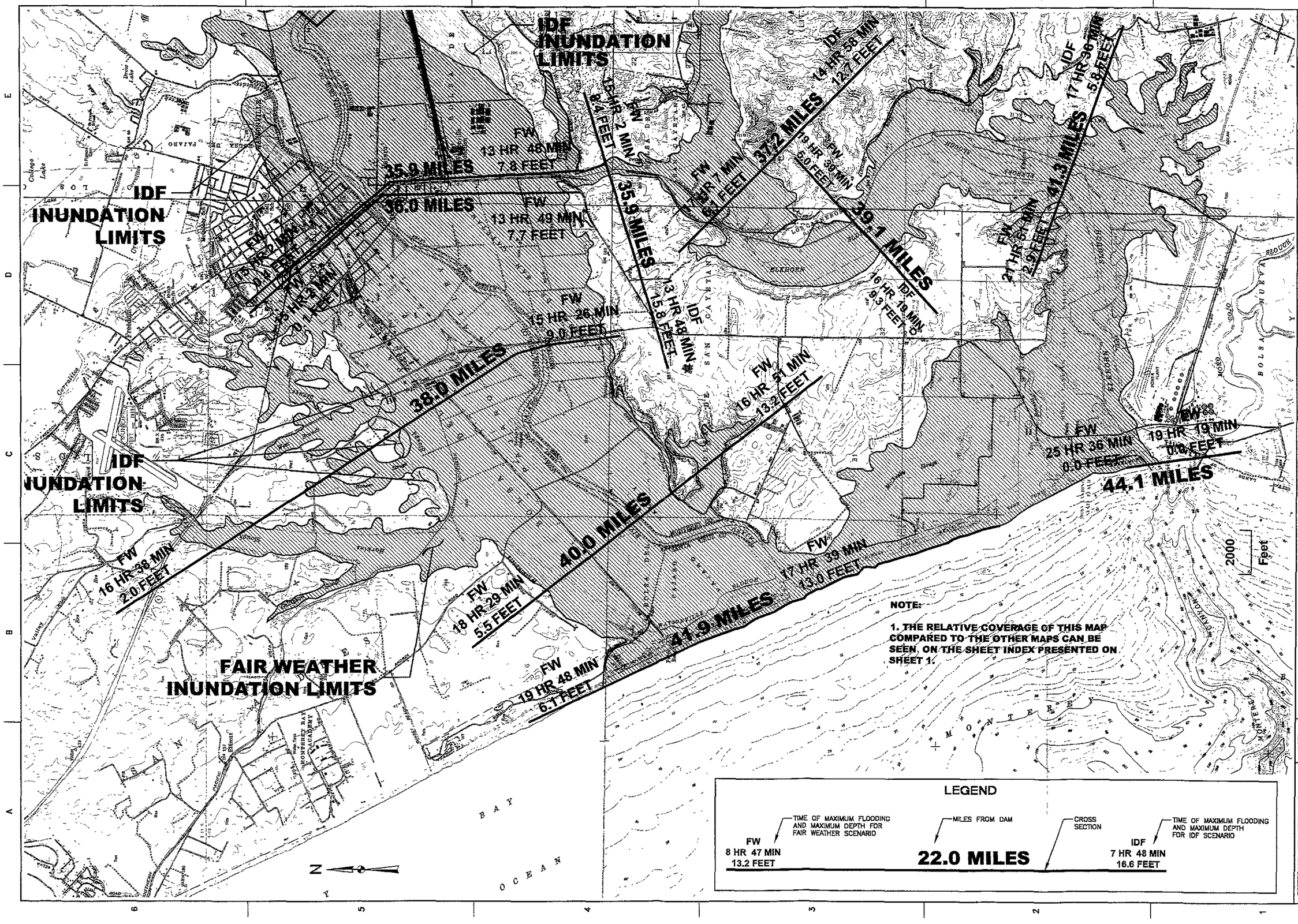
Santa Clara Valley Water District

ACCEPTED BY: R. Wolfe

REVIEWED BY: V. Romero

DATE MARCH 2003
DESIGN MOK
DRAWN SG
CHECKED MOK

REFERENCE INFORMATION AND NOTES:
1. *BACKGROUND MAPPING SOURCES:*
A. ORTHOPHOTOS PRODUCED BY TRIATHON LTD, APRIL 2001
B. USGS 7.5 MINUTE QUADRANGLES
– CHITTENDEN, 1993
– PRUNEDALE, 1993
– SAN JUAN BAUTISTA, 1993
– WATSONVILLE EAST, 1995



ANDERSON DAM EAP 2003
FLOOD INUNDATION MAPS
35.9 TO 41.9 MILES SOUTH OF DAM

MEAD & HUNT

SCALE 1" = 4000'

VERIFY SCALES 1/2" 0

BAR IS 1/2 INCH ON ORIGINAL DRAWING IF NOT 1/2 INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

SHEET 12

Santa Clara Valley Water District

REVIEWED BY: [signature]

ACCEPTED BY: [signature]

DATE MARCH 2003
DESIGN MOK
DRAWN SS
CHECKED MOK

REFERENCE INFORMATION AND NOTES
1. BACKGROUND MAPPING SOURCES:
A. ORTHOPHOTOS PRODUCED BY TRIATHON LTD, APRIL 2001
B. USGS 7.5 MINUTE QUADRANGLES
– MOSS LANDING, 1994
– PRUNEDALE, 1993
– WATSONVILLE EAST, 1995
– WATSONVILLE WEST, 1995